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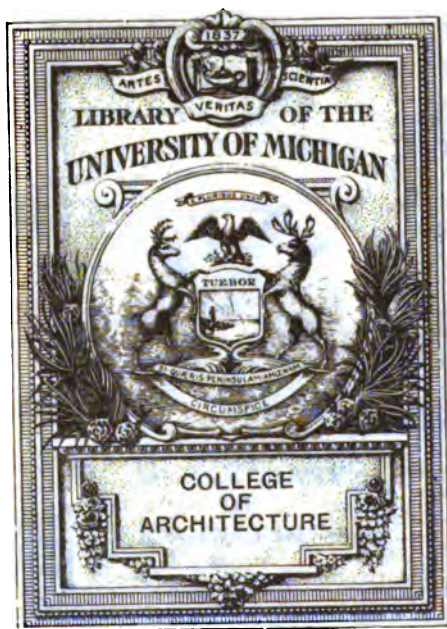
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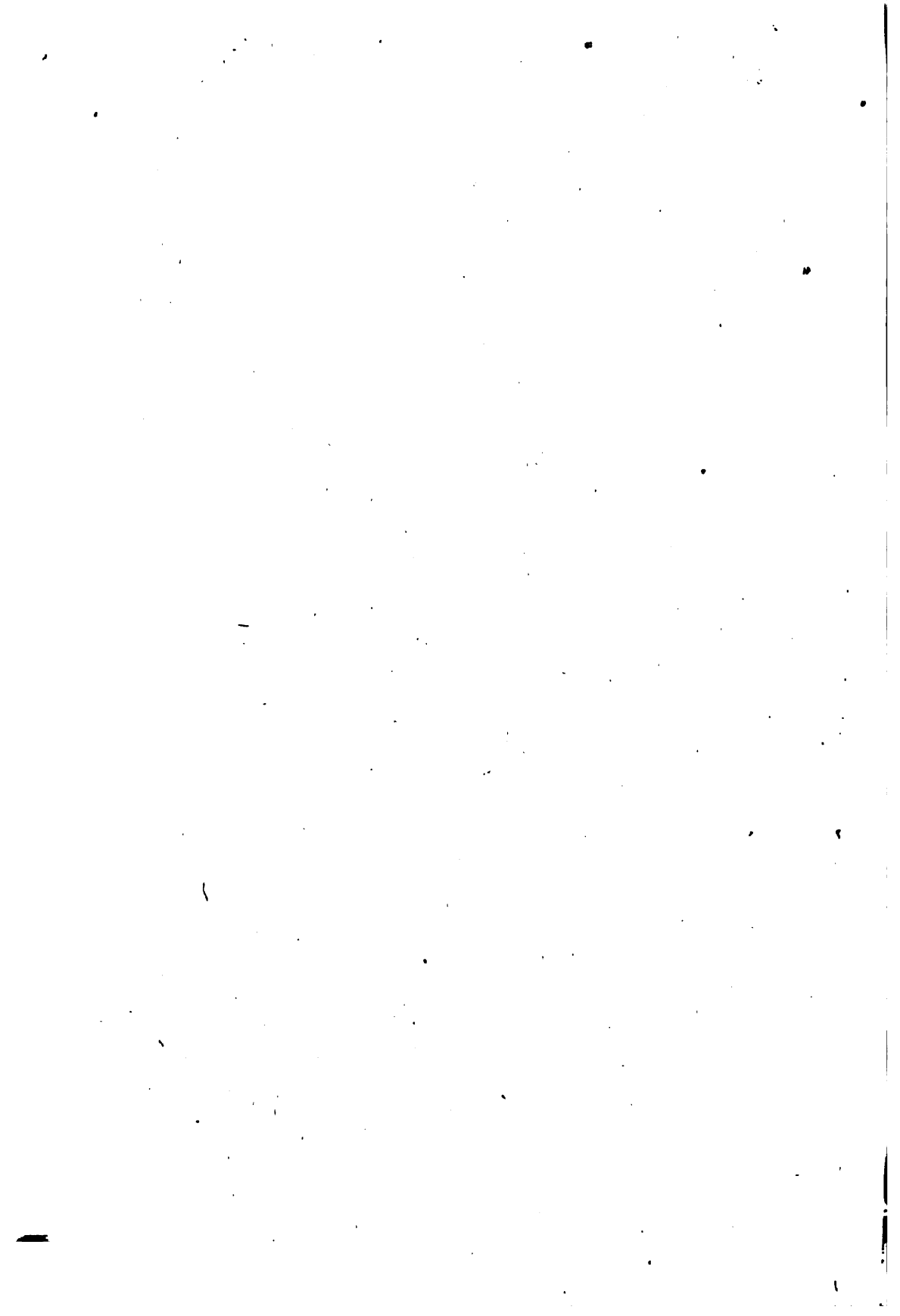


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## THE PHENE SPIERS TESTIMONIAL.

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IN the Spring of 1904 a small meeting of old friends and pupils of Mr. R. Phené Spiers was held in London for the purpose of initiating a movement to recognise in some tangible form the important services rendered by him during the last twenty-five or thirty years, in acting as the friend and adviser of architectural students of various nationalities, and helping to raise their ideals of architecture; and also to show an appreciation of the value of his published contributions to the archæology and literature of architecture.

A large and influential Committee was formed and a small executive committee selected, consisting of the following members:—

Sir Aston Webb, *Chairman*.

Mr. J. J. Burnet.

Mr. E. Guy Dawber.

Mr. Theodore Fyfe, *Assistant Secretary*.

Mr. W. Curtis Green.

Mr. W. R. Lethaby.

Mr. Walter Millard.

Mr. R. W. Schultz, *Hon. Secretary and Treasurer*.

This Committee at once proceeded to formulate a scheme for presenting Mr. Spiers with a Testimonial; to arrange a Gathering, at which he should be entertained and acclaimed; and to prepare an Address to be presented to him.

There was a very liberal response from architects and others, both at home and abroad, to the appeal issued by the Committee, and it was decided and arranged that the recognition should take the following forms: (1) A bronze medallion

bearing a portrait of Mr. Spiers, with a suitable reverse. The model for this has been prepared by Professor Edward Lanteri, of the Royal College of Art, South Kensington, and the bronze will be presented to Mr. Spiers: (2) Reductions of the same, available for distribution amongst his friends, and which will eventually form part of a prize to be connected with Mr. Spiers' name, for which purpose the residue of the collected funds will also be applied: (3) The publication of this volume of Essays: (4) A present to Mr. Spiers of a collection of Architectural books: (5) The entertaining and acclaiming of Mr. Spiers at a dinner on February 27th, 1905, and the presentation to him of an Address signed by a large number of those whom the Committee approached.

This Address has been beautifully illuminated by Mr. Allan Vigers and further embellished by a miniature portrait of Mr. Spiers, painted by Sir Charles Holroyd.

The following is the text of the Address:—

To Richard Phené Spiers, Architect; Master of the Architectural School of the Royal Academy of Arts; Fellow of the Royal Institute of British Architects; Fellow of the Society of Antiquaries; Member and Past-President of the Architectural Association, London; Member of Council of the Japan Society; Member of the Hellenic Society; Associate and Honorary Fellow of King's College, London; Honorary Corresponding Member of the "Société Centrale des Architectes," Paris, and of the "Sociedad de Los Arquitectos," Madrid; Gold Medallist, Scholar and Travelling Student of the Royal Academy of Arts; Soane Medallist and Travelling Student of the Royal Institute of British Architects; &c. &c.; Author of "Architectural Drawing," and "The Orders of Architecture"; Joint Author of "The Architecture of Greece and Rome"; Editor of a new edition of Fergusson's "History of Architecture in all Countries"; and Author of Architectural and Archæological Essays on "Pierrefonds," "Sassanian Architecture," "Domed Churches in Périgord," "The Mosque at Damascus," and other subjects.

We, the undersigned Architects, Students of Architecture, and Workers in the Arts, desire to give expression to our regard for you, and to mark our appreciation of your scholarly attainments,



and of the good work which you have done in forwarding the study of architecture during many years, in the course of which you have not only won distinction for yourself, but have done so much to help others.

We also desire to record our acknowledgment of your labours in the cause of architectural education, and of the hearty aid which you have always been so ready to afford as a friend and counsellor.

Many of us gratefully remember the kindness of your welcome, your constant sympathy and your interest in our student life and subsequent work.

The "Société Centrale des Architectes Français" has contributed to the General Testimonial Fund, and is sending to Mr. Spiers in his capacity of corresponding member "une grande médaille de vermeil," and M. Pascal, who will represent the Society at the dinner in London, has been charged to present this medal to Mr. Spiers together with an address signed by members of that body.

M. Pascal will also be the bearer of the felicitations of the "Anciens élèves" of the atelier Blouet-Gilbert-Questel-Pascal to their former fellow-pupil.

The American Institute of Architects, sympathising with this movement, have elected Mr. Spiers an honorary member of their Society, "not only" (as is expressed by one of them) "on account of his scholarly attainments, and the contributions he has made to architectural education in England, but because of the wise counsel and friendly assistance which he has so often given to American students of architecture whilst in London."

On behalf of the Committee,

ROBERT WEIR SCHULTZ,

Hon. Secretary and Treasurer.

LONDON,

*February 27th, 1905.*







# ARCHITECTURE EAST AND WEST

A COLLECTION OF ESSAYS  
WRITTEN AT VARIOUS TIMES DURING  
THE LAST SIXTEEN YEARS,

BY  
R. PHENÉ SPIERS, F.S.A., F.R.I.B.A.

NOW FIRST BROUGHT TOGETHER  
AND ISSUED WITH FURTHER  
ILLUSTRATIONS AS PART OF A  
TESTIMONIAL TO THE AUTHOR.

PUBLISHED FOR THE COMMITTEE  
OF THE SPIERS TESTIMONIAL BY  
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## INTRODUCTION.

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THE essays on some phases of the Architecture of the past here gathered together have been arranged by Mr. Spiers in answer to a request that he would allow them to be reprinted. It was felt that, scattered as they were, these valuable contributions to the history of the Building Art were not readily accessible, and did not take the place they should do amongst works of reference.

Mr. Spiers has made the whole course of Architectural History the object of his survey, and the studies which this volume contains may, perhaps, be considered as supplementary to his own edition of Fergusson's "History of Architecture."

Many of those who have learnt not only from his published work, but more directly also, wish to take this opportunity of thanking him.

W. R. L.

*February 27th, 1905.*

## NOTE.

THE Committee of the Spiers Testimonial desire to express their thanks to the Council of the Royal Institute of British Architects, to the editor of the Builder, and to the editor of the Architectural Review, for permission to reprint the papers which have appeared in their various journals ; also to the Council of the Royal Institute of British Architects for the loan of original illustration blocks.

Further illustrations have been supplied by Mr. Spiers, and he has made various corrections in the text where subsequent research has rendered this advisable.

The essays are here reprinted in the order in which they were originally published.

Mr. Theodore Fyfe has very kindly prepared the Index.

The indefatigable exertions, both of the author and of the publisher, given at short notice and against extreme pressure of time, have made it possible to publish the volume for presentation to Mr. Spiers on the occasion of the gathering in his honour on February 27th, 1905.

R. W. S.



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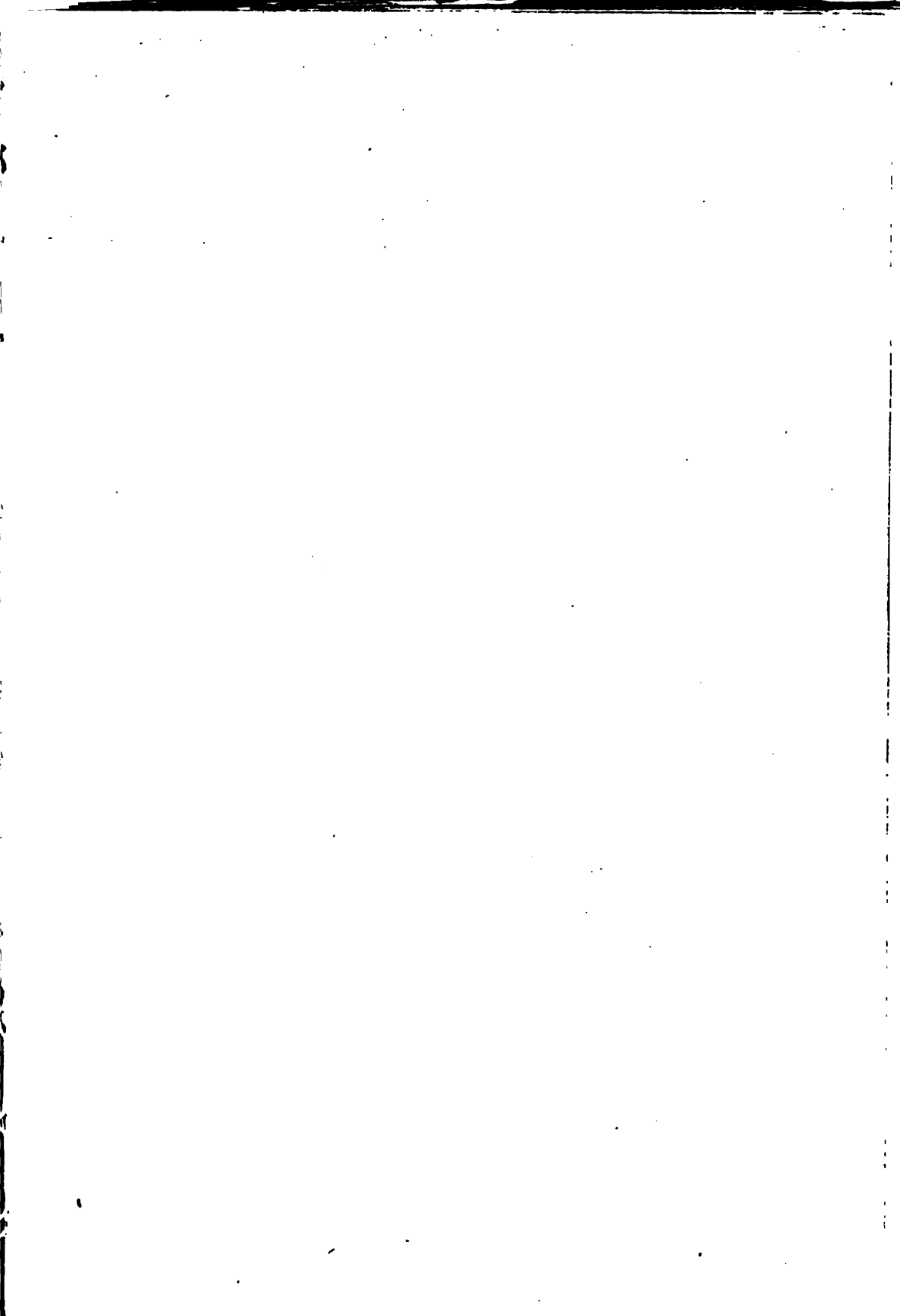
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# MAHOMETAN ARCHITECTURE.

A PAPER READ AT A MEETING OF

THE ARCHITECTURAL ASSOCIATION,

ON FEBRUARY 3RD, 1888

(REPRINTED, BY PERMISSION, FROM *THE BUILDER*).

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## SUMMARY.

REASONS FOR ADOPTING THE TITLE MAHOMETAN—FERGUSSON'S INTRODUCTION TO THE SUBJECT—THE EARLIEST MOSQUES BUILT—AMR IN EGYPT AND KAIRWAN IN BARBARY—THE SUCCEEDING MOSQUES IN EGYPT—IBN-TOOLOON—EL HAKIM—EL AZHÂR—EZ ZAHIR—MERDANEE—HASSAN—IMAM-ESH-SHAFFEY BERKOOK AND KAÏT BEY—DOMESTIC ARCHITECTURE—HOUSE OF THE MOOFTEE IN CAIRO—GREAT MOSQUE AT MECCA—KAIRWAN IN BARBARY—CORDOVA IN SPAIN—MOSQUES IN PERSIA AT TABREEZ AND ISPAHAN—INDIAN MOSQUES AT DELHI, AJMIR, JAUNPORE, MARTTAND, AHMEDABAD, MANDU, BENGAL, GAUR, KALBURGAH, BIJAPUR—FUTTEHPORE SIKRI—THE TAJE MEHAL AND THE PEARL MOSQUE—THE MOSQUES IN CONSTANTINOPLE—THE PRINCIPAL DECORATIVE FEATURES OF THE STYLE—THE ENTRANCE PORCH—THE MINARET—THE LOGGIA AND THE DOME, AND CONSTRUCTION OF SAME—DECORATIVE DETAILS SUBJECTED TO THE RELIGIOUS PRECEPTS OF THE KORAN—THE VARIETIES OF ARCH FORMS—INQUIRY INTO THE ORIGIN OF THE STALACTITE VAULT.

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## STALACTITE (HONEYCOMB) VAULTING, ITS ORIGIN IN SARACENIC ARCHITECTURE.

A FURTHER INQUIRY INTO THE SUBJECT  
COMMUNICATED IN AN ARTICLE TO THE

JOURNAL OF THE ROYAL INSTITUTE OF BRITISH ARCHITECTS  
ON THE 26TH OF APRIL, 1888.

It should be mentioned that this article, which is reprinted by permission from the Journal, repeats many of the arguments already laid down in the paper read at the Architectural Association summarised above.

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THE DERIVATION OF THE DECORATIVE FORMS OF ARCHITECTURE FROM THOSE ORIGINALLY BASED ON CONSTRUCTIVE REQUIREMENTS—VARIOUS ATTEMPTS TO DEFINE THE ORIGIN OF THE STALACTITE VAULT—TO BE SOUGHT FOR IN EARLY BRICK RATHER THAN IN STONE CONSTRUCTION, AS IN EGYPT—CONJECTURAL RESTORATION OF THE TOMB OF ZOBEIDE, IN BRICK, SHOWING THE SERIES OF NICHEs ONE OVER THE OTHER—COMPARISON WITH THE FORMATION OF STALACTITE NICHEs AS PRACTISED AT THE PRESENT DAY—EARLY EXAMPLES OF THE VAULT IN PALERMO—ITS SETTING OUT IN CAIRO—VARIETIES OF FORM AND APPLICATION IN STONEWORK—SUBSEQUENT REPRODUCTION IN WOOD, AND ITS LAST DEVELOPMENT IN PLASTER IN THE ALHAMBRA.

S.T.

B





## MAHOMETAN ARCHITECTURE.

TWENTY-ONE years ago, shortly after my return from my tour in Egypt, I read a paper before the members of this association on "Ancient Egyptian Architecture." It was my intention to have followed it up in the succeeding year by one on the Saracenic Architecture of Cairo. Other subjects in the interval turned up, apparently of more interest for the moment, so that its preparation and delivery has been delayed. In the meantime many publications have appeared which on the one hand have facilitated my researches; on the other have deprived the subject of some of the novelty it might then have possessed. Among these works is one written by Mr. Stanley Lane Poole on *The Arts of the Saracens in Egypt*, which deals more or less exclusively with the architecture of Cairo, and, therefore, to a certain extent, cuts away the ground from under my feet.

It occurred to me, however, first, that I might take a broader view of the question and trace out the development of the style in other countries besides Egypt; and, secondly, that I might dwell on the architectural and constructional features of the style, endeavour to ascertain their origin, and deduce therefrom lessons which might be useful to the architectural student. It is for this reason that I have adopted the term Mahometan in the place of Saracenic. Mr. Poole, in advocating the latter term, points out that Saracen means Eastern, and was the universal designation of Moslems in the middle ages. He takes exception to the terms Arab and Mahometan, because the artists who built for the followers of Mahomet were seldom Arabs and frequently Christians. In that hypothesis he is quite correct, but it was the Mahometan religion which laid down the rules

for the plans and features of the mosques ; it was the restriction of that faith which led to all its characteristic features ; and the term Saracenic can hardly be applied to the architecture of Spain, Persia, or Turkey, and only with the prefix of Indo- to its glorious development in India. It is possible that even Mahomet himself never dreamt of the magnificence in the development of the style which his precepts were destined to bring forth, such as are displayed in the mosques of Cordova in Spain, of Ibn-Tooloon and Sultan Hassan in Cairo, of Ispahan in Persia, the Suleimanie at Constantinople, or of the mosque tombs of Delhi, Cawnpore, Ahmedabad, Bijapur, and the Taje Mehal in India. None the less, however, these monuments are the natural outcome of a style based on the requirements of the religion, restricted by the precepts which were set forth by Mahomet in the Koran, and of which style, therefore, he laid the foundation.

That you may be able more clearly to follow the description which I propose to lay before you this evening, I feel that I cannot do better (by way of preface) then quote some paragraphs from the introduction given by our great historian, Fergusson, to his chapter on Saracenic Architecture in Christian countries :—

“ The first century of the Hejira forms a chapter in the history of mankind as startling from the brilliancy of its events, as it is astonishing from the permanence of its results. Whether we consider the first outburst of Mahometanism as a conquest of one of the most extensive empires of the world by a small and previously unknown people, or as the propagation of a new religion, or as both these events combined, the success of the movement is without a parallel in history.”

“ Had it been a mere conquest it must have crumbled to pieces as soon as completed ; for Arabia was too thinly populated to send forth armies to fight continual battles and maintain so widely extended an empire. Its permanence was owing to the fact that the converted nations joined the cause with almost the enthusiasm of its original promoters ; Syria, Persia, and Africa, in turn sent their swarms to swell the tide of conquest and to spread the religion of Islam to the remotest corners of the globe. To understand either Mahometan history

or art it is essential to bear this constantly in mind, and not to assume that, because the first impulse was given from Arabia, everything afterwards must be traced back to that primitive people; on the contrary, there was no great depopulation, if any, of the conquered countries, no great transplantation of races. Each country retained its old inhabitants, who, under a new form, followed their old habits and clung to their old feelings with all the unchangeableness of the East, and, perhaps, with even less outward change than is usually supposed."

"So weak, indeed, in the converted countries was the mere Arabian influence, that each province soon shook off its yoke, and under their own Caliphs, Persia, Syria, Egypt, Africa, and Spain soon became independent States, yielding only a nominal fealty to that Caliph who claimed to be the rightful successor to the Prophet, and, except in faith and the form of religion, the real and essential change was slight, and far greater in externals than in the innate realities of life."

"The Arabs themselves had no architecture, properly so-called. Their only temple was the Kaabah at Mecca, a small square tower, almost destitute of architectural ornament, and more famous for its antiquity and sanctity than for any artistic merit."

"It is said that Mahomet built a mosque at Medina,—a simple edifice of bricks and palm-sticks. But the Koran gives no directions on the subject, and so simple were the primitive habits of the nomad Arabs, that had the religion been confined to its native land, it is probable that no mosque worthy of the name would ever have been erected. With them prayer everywhere and anywhere was equally acceptable. All that was required of the faithful was to turn towards Mecca at stated times and pray, going through certain forms and in certain attitudes, but whether the place was the desert or the housetop was quite immaterial."

It follows from this description that it will scarcely be in the earlier Mahometan buildings we should expect to find the characteristic features and details which constitute the style. At the same time, simple as the early tenets of the faith may

have been, there soon arose that natural desire for extension of plan and architectural magnificence which is inherent in mankind, and which at an early period after the Hejira showed itself, more especially as Fergusson points out, when the Mahometans came amongst the temple-building nations, then they seem to have felt the necessity of having some material object, some visible monument of their religion, some feature which should point out to the faithful the direction of Mecca towards which they should turn at the time of prayer. This feature, called the kibleh or mihrab, was a niche or recess placed in a wall, the direction of which would run at right angles to a straight line from Mecca. In Egypt this would be south by east, in Spain east by south, in Persia south by west, and in India west.

In Jerusalem and Damascus the followers of Mahomet found Christian buildings, which for the moment, with slight modifications, served their purpose. In Egypt, however, the mosque of Amrou or Amr, in Old Cairo, was founded in 642 A.D., and in Barbary, the mosque of Kairwan, in 675 A.D. The plans of these two buildings were novel, and constituted a new arrangement. It is difficult to determine which of the two mosques can claim to have been the model on which subsequent mosques were planned, but there is no doubt that Mr. Carpenter (in the paper which he read before the Royal Institute of British Architects in February, 1884) is right in disputing the claim of the mosque at Mecca as the model. Before, however, entering into this question, it may be as well to point out the requirements of the new religion. The first was, as already observed, the kibleh wall, in front of which an area, which might be from 30 to 60 feet deep, had to be covered over for protection from the sun's rays; it was necessary, therefore, to have points of support. These they found in the columns and capitals taken from earlier Roman, Byzantine, Coptic, or even Egyptian buildings. These points of support not being sufficiently high, they threw arches across, tying them in with wooden ties at their springing, and formed a series of aisles all running towards the Mecca wall. This is the first architectural development peculiar to the earlier mosques, though subsequently modified. In front of this vista of aisles





1.—PRAYER-CHAMBER OF MOSQUE OF AMR, OLD CAIRO.

known as the prayer-chamber would be an open court, enclosed with walls and a covered arcade round from the entrance, which was generally placed in the opposite wall to that of Mecca (see Ill. 101).

Now, turning to Egypt, first let us consider the plan of the mosque of Amrou, of which the prayer-chamber is illustrated in Ill. 1. It consists of a court 390 feet by 357 feet, on the south-east side of which are twenty-two aisles running at right angles to the Mecca wall, and six columns deep; on the north-east side the aisles run parallel to the main aisles, and are five deep; on the south-west, four deep; and on the north-west, one running parallel with the north-west wall.

The argument in favour of the antiquity of the plan of Amr, as we now find it, lies in the fact that all the columns and capitals are about the same height, and are all taken from earlier buildings.

There is a square die above the capitals, which also might date from the earlier period, but above that there is an appearance in the arches (which are sometimes round, sometimes pointed, and sometimes round, with the upper portion raised by straight lines to a point, apparently to prevent the sinking of the voussoirs of the upper part of the arch) of reconstruction at some later date, so that we are unable to accept them as ancient.

In the south-east (the Mecca wall) are some pointed arches, now built up. If they are of the date of the foundation of the mosque they prove the antiquity of the pointed arch to be greater than is generally accepted.

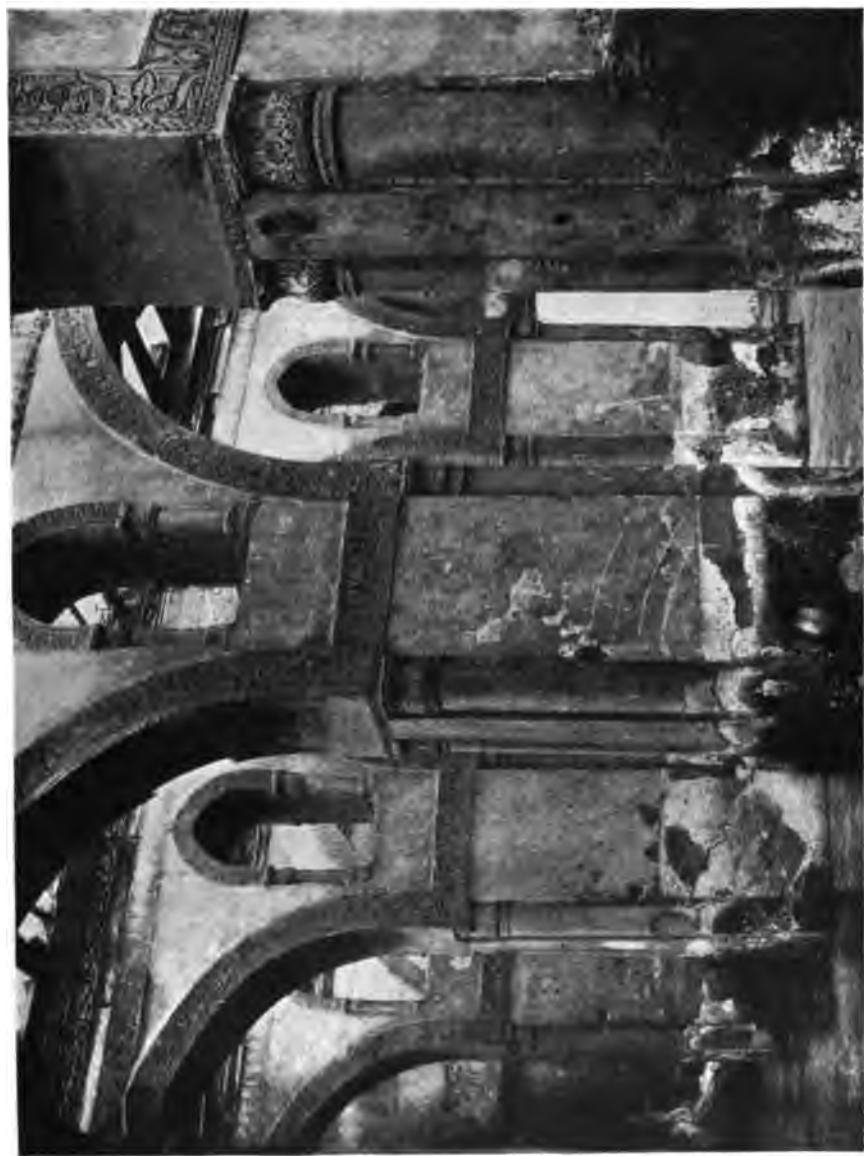
The next mosque in Egypt in point of date is that of Ibn-Tooloon, 877 A.D. It is recorded that the architect objected to the use of materials taken from other more ancient buildings. We accordingly find in this mosque the first example of the new style: all trace of imitation of earlier work, whether Roman or Byzantine, having disappeared. Fergusson is inclined to look to Damascus and Bagdad as having influenced the result, but as no remains of buildings of earlier date in those towns are now to be found, and as tradition ascribes the design to a Copt or Christian architect, there is no reason to suppose that it is not indigenous. This is further confirmed by the valuable addition to our knowledge of Early

Christian architecture in Egypt by the work of Mr. A. J. Butler on the *Ancient Coptic Churches in Egypt*, published in 1884, which shows us that the tradition of building was preserved by the Copts from the earliest period of our era—that the Delta and the banks of the Nile for at least 1,000 miles south, abounded in Christian churches—and that the materials employed in the earlier mosques at Egypt were probably taken from Coptic churches, the architects of whom had made use of the Roman and other features of still earlier buildings. In no other way is it possible to account for the preservation, after so many centuries of the columns and capitals of Roman buildings. With the building of Ibn-Tooloon a new era commenced, and henceforth the new style takes its independent position. It is true that occasionally, even down to the fifteenth century, the temptation of using up old materials is not always resisted, but the method of their employment, and the type of ornament which was applied to them, is the direct result of the influence of the Mahometan religion.

The plan of the mosque of Tooloon is similar to that of Amrou. The court is 300 feet square. There are five aisles on the south-east (Mecca) side (Ill. 2), and two on the other sides. There is this difference, however, that the aisles on the Mecca side run parallel to, and not at right angles to, the Mecca wall. This alteration was possibly due to the constructive knowledge of its architect, who foresaw the difficulty, otherwise, of resisting the thrust of the much heavier superstructure above the arches. It is true that here, as at Amrou, there are occasionally wooden ties introduced at the springing of the arches, but these would have been insufficient for the purpose. The thrust by this new arrangement is carried to the outer walls, which are of great thickness and weight. The arches of these arcades are pointed, stilted above the capital, with a slight tendency inwards to what is known as the horseshoe arch. The curve below the springing is much flatter than that of the arch above. The arches are carried on piers and not columns, and the angles of the piers are decorated with engaged corner shafts, the earliest instance, I believe, of the feature.

Between the arches above the level of their springing are small pointed openings with engaged shafts at the angles, which





2.—INTERIOR OF MOSQUE OF IBN-TULOON, CAIRO.



give scale to the former. Bands of ornament with Cufic inscriptions are carried in horizontal lines at the springing and above the arches inside. The archivolts and soffit of the arches are decorated with similar ornament, as also round the windows in the external walls and round the walls of the internal court, where also are two or three bands of decoration, to which I shall refer later on. The windows are filled with stone slabs, pierced with that geometrical ornament which is always peculiar to Mahometan buildings. The use of pierced stone slabs owes its origin, doubtless, to Byzantine models. The whole building is executed in brick, the bricks measuring, according to Mr. Wild,  $7\frac{1}{2}$  inches by  $2\frac{1}{2}$  inches by  $1\frac{3}{4}$  inches thick, with thick mortar joints, the whole being covered with stucco.

The mosques succeeding Ibn-Tooloon are "El Hakim," 991—1014 A.D., built with piers; El Azhâr, with columns (subsequently rebuilt); Ez Zahir, 1267 A.D., with piers; and Merdanee, 1345 A.D., all with their aisles running parallel to the Mecca wall. In 1356 A.D., however, a new plan is evolved, which shows the immense progress made in construction. In the mosque of Sultan Hassan the aisled arcades are replaced by vast recesses or transepts, vaulted with pointed barrel vaults. Mr. Poole informs us that these recesses were allotted to the Malakis, Hannafis, Shafitis, and Hanbalis sects respectively. The great transept in the Mecca side is 69 feet wide, 90 feet deep, and 80 feet high to the crown of the arch. This plan was subsequently copied in other examples, those of the mosque of Sultan Berkook in Cairo, El Ghoree, and Kaït Bey, outside Cairo, amongst others. There is another feature in the plan of mosques to which I should now direct your attention, viz., the dome. As Mr. Poole observes, however, "a dome has nothing to do with prayer, and therefore nothing with a mosque. It is simply the roof of a tomb, and only exists when there is at least a tomb to be covered, or where it was intended that a tomb should be." "It happens, however, that a large number of the mosques of Cairo are mausoleums, containing the tomb of the founder and his family." "Most mosques with tombs have domes, but no mosque that was not intended to contain a tomb ever had one in the same sense." Mr. Poole ascribes the

origin of the dome to the cupolas which surmount the graves of Babylonia, but points out that it was never used by the Mahometans to cover their temples of prayer.

The earliest dome in Egypt is probably that of Imam-esh-Shafeey, built by Saladin, outside Cairo, but it has been so often restored that one cannot trust to its antiquity. In Kalaoon and Sultan Hassan the tomb is added to the plan of the mosque, being a subordinate feature, but when once introduced it becomes the favourite. In the tomb mosque of Sultan Berkook, however, we find a variety of plan in which the tomb was the chief feature and the mosque of second importance. Here the tombs are placed on the south-east side of the building, the Mecca aisles standing between them and the usual court with aisles, entrance portals, and minarets on the north-west. The covered portions are sustained by piers with flat cupola vaults in brick. The last mosque found in Egypt to which I shall refer is that of Sultan Kait Bey, outside the walls, one of the most graceful monuments of the style (Ill. 3). Its plan is similar to that of Sultan Hassan, but being of much smaller dimensions, the court is covered over and lit by a lantern. The great transepts or niches are not vaulted, but covered with timber roofs with beams richly painted and carved, and the spaces between sunk with coffers.

There are no palaces of ancient date in Egypt, and the only other architectural features which demand notice are the gateways and walls, which are of simple ashlar masonry, the only decoration being the archways, the orders of which are enriched with conventional ornaments and shields carved in relief. The sebeels, or drinking-fountains, are of various dates; they are placed at the angles of streets, or built out into the street like a bow window. Bronze grilles of various designs are fitted in the openings, and on the upper floor is invariably a school.

Mr. Stanley Lane Poole's work, *The Arts of the Saracens in Egypt*, contains plans of the domestic architecture of Cairo, and seeing that, as a rule, the features there found are derived from mosque architecture, there is no reason to direct special attention to it. Their architecture is confined to the entrance doorway and the internal court, on one side of which is



3.—MOSQUE OF KAÏT BEY, OUTSIDE CAIRO.



frequently found an open loggia on the first floor, with two or three pointed arches carried on columns.

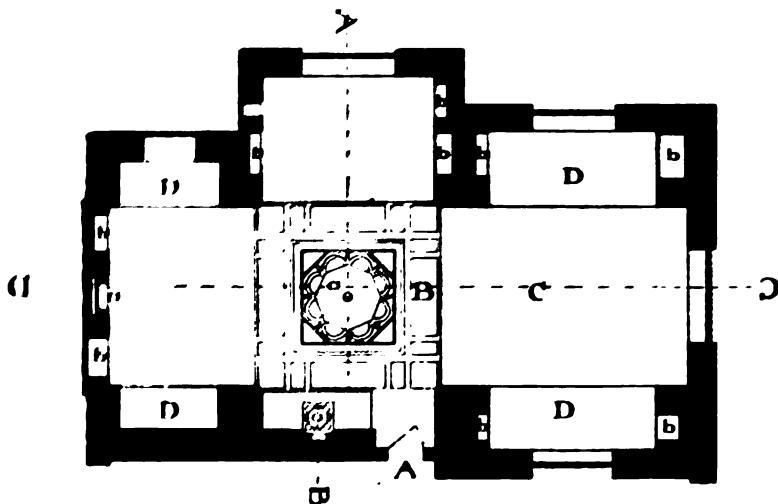
Both in this court, however, and on the external front are innumerable examples of the feature known as a *mushirabēeyeh*,—an oriel window of elaborately carved or lathe-turned wood-work, carried on timber corbels, which are generally in imitation of stone vaulting: the term given to this feature is derived from a miniature oriel window projection, in which is placed the water-bottle. These water-bottles are of porous clay, and the wind passing through the lattice work causes a rapid evaporation of the moisture which exudes through the bottle and keeps the water cool. These *mushirabēeyeh*, and other projecting features of a house on corbels, and the doorways, form all that is architectural in the streets.

The principal apartment in the house is called a *mandarah* (Ills. 4 to 7), which is used for the reception of guests. It consists of a lofty hall with fountain in the centre, and deep recesses on two of its opposite sides, both raised a foot or so above the level of the hall; round the more important of these is placed the *divan*. The walls are decorated with marble and tiles to a height of about 7 feet or 8 feet from the floor, intercepted at intervals by recesses or cupboards with elaborate panelled doors, and sometimes with wall fountains. The room is lit chiefly by windows in the upper part of the hall, these windows being formed in plaster, having a sort of tracery with elaborate patterns. The glass is of various colours, and the section of the plaster is so contrived that, placed as these windows are high up in the hall, the reflection only of the light coming through the glass is seen, which gives a softness and a beauty to the light, which must be seen to be realised. The ceilings are all of wood, with richly decorated beams, coffers between, and a richly-painted coved cornice between the soffit of the cornice and the top of the 8-foot dado is a space which may have been left plain, relieved, or covered with diaper; now, the only examples I have seen are decorated with modern landscapes of inferior Italian work.

The following is taken from a description communicated to the Royal Institute of British Architects in 1890:—

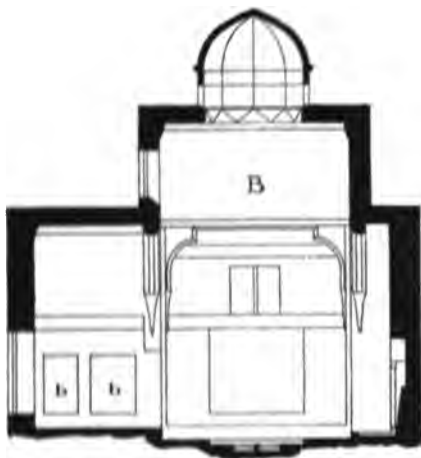
The *mandarah*, of which three illustrations are here given, is

that of the house of the mooftee in Cairo. On the right-hand side on entering at A (Ill. 4) is the principal liwan (C), the floor



4. - PLAN OF THE MANDARAH, HOUSE OF THE MOOFTEE, CAIRO.

of which is raised, like a daïs, about a foot above that of the durka'ah (B), with two recesses (D D), in which are couches.

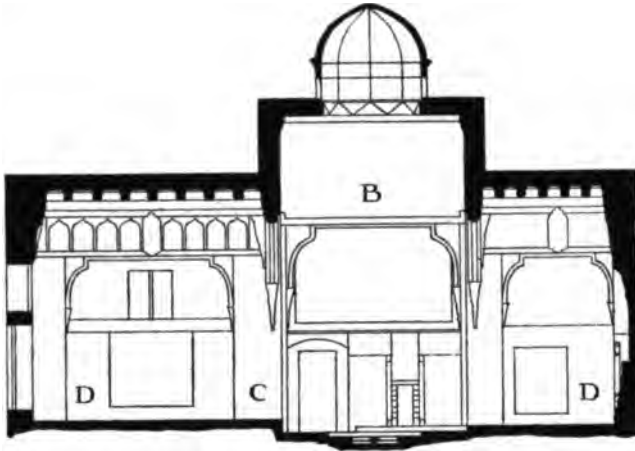


5. - TRANSVERSE SECTION OF THE MANDARAH, SHOWN IN FIG. 4.

On the opposite side is a second liwan of less depth, also with couches and recesses (D D). At the head is a fountain (A), with cupboards (b b) on either side. A second fountain, also in a recess, is to the left of the door A. The depth of these recesses is about 10 feet, and the section through one of them is shown in section (Ill. 5), its elevation and section (Ill. 6). From a height of about 4 feet from the floor the water trickles over a marble shelf



on to a raking marble slab, the lower portion of which is about 2 and the upper 3 inches from the wall. This slab is intended to catch the water as it trickles down, and it



6.—LONGITUDINAL SECTION OF THE MANDARAH.

is flanked on each side by a kind of inlaid mosaic work, whilst at the extreme outside are vertical troughs, forming steps one in front of the other, over which the water falls into a



7.—FOUNTAIN IN THE DURKA'AH, HOUSE OF THE MOOFTEE, CAIRO.

square marble basin, inlaid with mosaic work. The most important fountain, however, is that in the centre of the durka'ah, a view of which, reproduced from a photograph, is

given in Ill. 7. The pavement of this fountain and the square portion of the hall in which it is placed, is in white marble, the panels and decorative lines are inlaid with marbles of various colours in geometrical patterns. These are set out by the artist on the ground—not copied from drawings—a much greater variety in design being thereby obtained, in harmony with the material and the size of the tesserae at his disposal.

Passing now to other countries: the Great Mosque at Mecca (from which it was at one time thought that the plans of the Egyptian and other mosques were taken) is necessarily different from all others, because the kaabah, to which all the niches in other mosques turn, stood in its centre. The arcades or aisles which surround the court are known to have been built by Egyptian and Constantinopolitan sultans in the sixteenth and seventeenth centuries; in fact, the whole mosque was in 1626 nearly destroyed by a torrent, and the sacred walls of the kaabah itself were thrown down and had to be rebuilt from their foundation.

I am, therefore, able at once to go on to Kairwan, in Barbary, the mosque of which has been described by Mr. Carpenter in the paper read before the Institute in 1884.

The mosque of Kairwan was built in 675 A.D., the position of the kibleh having been correctly ascertained by the Emir Akbar. There have been subsequent rebuildings, so that it is not possible to be quite certain of the original plan. As it stands it forms an oblong, 427 feet by 225 feet, with a prayer-chamber at the Mecca end, of seventeen aisles, eleven bays deep: more than twice the depth, therefore, of Amrou. On the north side and the other two sides of the court are double aisles, with a minaret in the centre of the building.

The entrance porches lead to the centre of the prayer-chambers, one on each side. The columns employed to carry the horseshoe arches are of different heights, 22 feet in the centre aisle and 15 feet in the side aisles, the mihrab being at the end of the central aisle. In the mosques of Amrou and Tooloon there is no difference between the central and side aisles.) Both columns and capitals at Kairwan were taken from ancient Roman buildings, and, as at Amrou, the arches are tied together by wooden beams at their springing.

The mosque of Cordova was built by Abd-el-Rahman in 786—9 A.D. in imitation of the mosque of Kairwan. There were eleven aisles of twenty-one bays, the centre one slightly wider than the other. The materials were taken from earlier buildings, and, as it happened that the columns and caps were not considered high enough, above the horseshoe arches are built a second row of arches which carry the barrel vaults. To this mosque El Hakim added twelve more bays in depth at the Mecca end (A.D. 962), and in 985 El Mansour added eight more aisles of thirty-three bays on the east side. Part of the open court on the north side dates from Abd-el-Rahman's foundation, 690 A.D., and part from El Mansour.

#### PERSIA AND INDIA.

With the exception of the tombs of Zobeide and of Ezekiel, near Bagdad, the latter of unknown date, and a hospital at Erzeroum, of the twelfth century, the Mahometan style in Persia commences in the thirteenth century, when Ghengis Khan built the mosque at Tabreez in 1294. The drawings given of this in Texier's *Arménie et la Perse* suggests that, although no typical plan of the style had been then evolved, some considerable advance had been made in these decorative features which constitute the Mahometan style. The plan is that of a Byzantine church, with central dome, aisles, and sanctuary. The portal, however, consists of a lofty niche vaulted with semi-domes and stalactite pendentives, and similar in many respects to the well-known example of Sultan Hassan, built sixty years later. It is built in brick, and covered internally and externally with glazed bricks of various colours, wrought into the most intricate patterns of interlacing ornament and Cufic inscriptions.

The only building of a similar description which I have seen is the Dome of the Rock at Jerusalem, which is, as you may know, entirely covered with Persian tiles. The dazzling and perfect beauty in point of colour is not to be surpassed, but speaking from an architectural point of view it possesses the fatal sin of not showing its construction. The bricks and tiles are only a veneer, and, although in certain features such as the portal and the dome, where the construction is at least

suggested, the tendency is to trust to decoration alone to produce architectural effect. For internal decoration, where cornices and projecting features are out of place, the employment of such decoration is not only allowable, but is not at variance with accepted principles, and the tomb of the Sultan Khodabendah, at Sultanieh, illustrated in Texier's *Arménie et la Perse*, must be one of the most beautiful interiors in existence. Here the dome had not arrived at that bulbous form which we find in later examples.

The great mosque at Ispahan, 1585 A.D., is a good illustration of the danger attending a too free use of surface decoration; strip the walls of their tiles and nothing is left except square box-like forms with pointed arched openings of indifferent form. The interior, however, owing to the variety of its features and the varied play of light and shade given in the semispherical vaults of its transepts and niches and the vaulted aisles, constitutes, probably, one of the most beautiful monuments of Mahometan art. The plan is similar in one sense to that of Sultan Hassan, a large open court with large niches in the centre of each side flanked by arcades. One of these niches forms the entrance to the court, and behind the others are tombs surmounted by bulbous domes.

The Mahometan architecture of India would require at least a paper to itself. Fergusson devotes more than one hundred pages to it, and frequently deplores the insufficiency of data to describe it. "The Saracenic architects showed in India," he says, "the same pliancy in adopting the styles of the various people among whom they had settled, which characterised their practice in the countries already described. It thus happens that in India we have at least twelve or fifteen different styles of Mahometan architecture, and if an attempt were made to exhaust all the examples, it would be found necessary to even a greater number." He describes thirteen divisions, of which the following are the characteristics of some. The history of Mahometan architecture in Northern India commences at the end of the twelfth century, under the Turkish, or, as they are known, the Pathan dynasties; the mosques of old Delhi and Ajmir being the earliest examples. The conquering tribes employed their new subjects to carry

out their ideas, adopting for the mosque at Delhi the colonnaded courts of the Jaina temples, which served their purposes as regards plan, but building a new wall on the east side, with niches or kiblehs to point out the direction of Mecca, other walls round, and a magnificent range of arches on the western side, the three larger ones being 22 feet wide and 52 feet high. The construction of these arches is very singular, suggesting that the Mahometan conquerors insisted on an arch because it was the correct typical form of their religion; but left their Jaina subjects to build it in their own way. The arches are semicircular up to about two-thirds of their height from the springing, and built in horizontal courses. Then come two or three half voussoirs and half horizontal stones, the end being closed in with flat horizontal slabs, meeting in a point, and sometimes an indented form, suggesting the Flamboyant curve.

The mosque at Ajmir is again an adaptation of a Jaina temple, with a screen of arches in front of the prayer-chamber; the construction very similar to that at Delhi, except that all the courses are horizontal.

In tombs of the later Pathan styles we find the pointed arch used, resting on piers, but enclosed in a rectangular frame, which suggests that horizontal courses were employed. To the pendentives in these mosques I shall refer later on. In Jaunpore the chief mosque, the Jumma Musjid, still clings to the trabeated and bracketed styles, with magnificent archways, enriched with the peculiar cusped arch, which seems to have originated in India. The earliest example of the cusped arch is found in a temple at Marttand, in the Himalayas, which may date from the ninth century. In this temple, and in later examples, the cusped arch is used decoratively and not constructively.

In the province of Guzerat, the mosques at Ahmedabad are, according to Fergusson, the most elegant and characteristic of the Indo-Saracenic styles. The plan of the Jumma Musjid is similar to that of earlier Egyptian mosques, the chief notable feature being the number of domes in the prayer-chamber. These are shown in the elevation, but the section given by Fergusson is not a dome, so that I am unable to say how they

are formed. The arch is inserted again in the façades here, not because it was required, but as a symbol of faith. In tombs the dome is apparently introduced for the same reason.

In Malwa, the Ghoree dynasty of Mandu enriched the country with various monuments, amongst which the Jumma Musjid of Mandu, 1405—1432, is the most remarkable mosque. It measures 290 feet by 275 feet, and is similar in plan to the usual type, viz., a courtyard, with five aisles on the Mecca side, —three on the sides and two opposite the prayer-chamber. The peculiarity in the architecture here consists—first, in the fact that, although built in a Jaina country, when the tradition of trabeated construction still obtained, they employed pointed arches throughout, and even their domes are carried on pendentives.

In Bengal, having nothing but brick, they were obliged to employ that material everywhere, and Fergusson points out that they invented a new form of roof, which had an important influence on the Mahometan and Hindu styles in modern times. The roof referred to is curvilinear in form, and is evidently copied from a framework of bamboo and thatch. (It is curious to note, as has been pointed out to me by Mr. Simpson, that in the early Buddhist buildings, the chaitya, or assembly hall, takes its form and decoration from earlier buildings executed in wood, with curved beams carried on purlins and posts, and this wooden construction is carved in the solid rock as a decoration. The Lycian tombs at the British Museum afford other instances of direct copying of wooden construction.) This Bengal roof is not of beautiful form, but it becomes generally adopted from 1650 onwards.

The mosque at Gaur is remarkable for the massive solidity of its piers and arches, and stands out in remarkable contrast to the somewhat slight architectural arcades of other Saracenic countries.

At Kalburgah there is no open court; all is covered over, light being admitted by the pointed arch openings in the external walls, and small openings in the small cupolas covering the site.

It is however, in Bijapur that we come to a style of architecture built with a higher aim, and in the Jumma Musjid

we find the dynasty of the Adil Shahis striving to develop a pointed arch and domical style with some remarkable results. The plan of the mosque is similar to the usual type except that the wall opposite the prayer-chamber was never built. The aisles of this chamber are five deep, and in the centre and occupying a square space of three bays each way is the earliest instance (1557—1577 A.D.), of what is known as the Bijapur dome. Instead of throwing arches across the angles at 45 degrees, they are carried to the second pier, and form a series of intersections on which the dome rests. In the tomb of Mahmud at Bijapur this scheme of construction is carried out to a much larger scale, the diameter of the hall being 130 feet by about 175 feet to the soffit of the dome. A complete description of this building and of its constructive qualities is given by Mr. Fergusson in a paper read before the Institute, to which I must from want of time refer you.

The architecture of the Mogul emperors is the last phase of Indo-Saracenic art I shall have to call your attention to; and the monuments erected by Shere Shah, 1534—1545 A.D.; Akbar, 1556; Jehangir, 1605—1628; and Shah Jehan stand forth among the most brilliant examples of the Moslem conquerors. Of the work of Shere Shah little remains but the record, but in Akbar's chief work, the mosque of Futtehpore Sikri, the entrance gateway is certainly one of the finest efforts of man's genius. To this I shall refer later on.

The absence of illustrations and want of time prevent my attempting to describe the Great Palace at Delhi (a palace which measures, exclusive of its gateways, 1,600 feet by 3,200 feet), and the description which is given of the Taje Mehal at Agra by Mr. W. Emerson in the Institute *Transactions* enables me to pass by that building, otherwise probably well known to you. Those of you who visited the exhibition at the Grosvenor Gallery of the great painter Verestchagin last year may have had the opportunity of seeing paintings of the later buildings of Shah Jehan's reign, notably the Pearl Mosque, one of the most elegant and beautiful buildings erected by the Moguls.

I come now to the last phase of the Mahometan style to which I shall have to draw your attention, that of the Turks

in Constantinople. As Fergusson remarks, "Had the Turks obtained earlier possession of Constantinople it is possible that the architecture might have taken a different form from that in which we now find it."

In 1455 A.D., however, modern reaction in design had set in, and the Italian Renaissance was commencing to influence Europe. Be that as it may, the influence which the mosque of Sta. Sophia exercised on its new possessors (seeing that the Mahometan conquerors have been ever ready to adopt and accept a pre-existing style) was not without its good effect in prescribing the forms which mosques should take; and, without entering into the first efforts made, we have only to look at the mosque erected by Suleiman the Magnificent, 1550—1555 A.D., the Suleimanie Mosque, to see that when a fine model is taken the result is not likely to be quite contemptible. So far from that, the interior of this mosque is the finest production of the sixteenth century. The disposition of the mosque of Sta. Sophia is adopted almost in its entirety. The plan measures nearly a square of 215 feet. In the interior is a dome 86 feet in diameter as against 100 feet at Sta. Sophia, and 156 feet the height of the dome as against 175 feet in the latter. In its section, the upper part, the cupola, is more accentuated; and the screen of three arches in the place of the double row of superimposed arcades in Sta. Sophia lessens the scale of the former. As is the case with Sta. Sophia, the exterior is wanting in architectural beauty owing to the want of height of the dome, the badness of the materials used, and the poverty of the minarets when compared with those of Egypt.

Besides this mosque, that of Sultan Ahmed (A.D. 1608), of about the same size, with simple piers to carry the dome, and four half-domed recesses instead of two, is a fine example. The exterior also is better arranged in the groups of its smaller domes. Both of these mosques have large courts preceding them, with arcades round and fountains in the centre. Of the architecture of Constantinople I have little to say, except that it is mostly modern and execrable in taste. There still exist, however, a number of fountains, of varied design, with much detail and beautiful ornament on them.

This terminates the first portion of my paper, in which I



have given a general description of the various phases of the style, and endeavoured to point out that they have arisen mainly from the plan and requirements of the religion.

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I have now to take up the second part of my subject, which describes in detail some of the decorative features which constitute its architecture, and which, it will be seen, are the natural consequences of the precepts laid down in the Koran, modified by such changes in the progress of the art, and the desire for architectural magnificence, which is the end and aim of the poetical and artistic requirements of mankind.

The treatment of walls is the first subject. In the earlier periods these seem invariably to have been constructed, when in stone, in plain ashlar masonry, the only decoration (excepting the ornament which decorated the openings of doors or windows) being shields, as in the Bab-el-Nasr at Cairo, or symbolic representations of tigers, as in the Gate of Damascus at Jerusalem. In the former of these two gateways there is a cornice, an unusual feature, consisting of a single moulded projection, supported on corbels. Cufic inscriptions, also, in raised letters, in a recessed frieze, are likewise found. When the walls were in brick, as in the Ibn-Tooloon mosque, and covered with plaster, the necessity for some further decoration than the stuccoed wall presented, resulted in bands of interlaced ornament and Cufic inscriptions. Besides these we find indented patterns, enclosed in a circle and forming a frieze. Round the upper part of the walls of the court of Ibn-Tooloon are a series of octagonal panels, with indented ornament, enclosed top and bottom with simple sunk mouldings.

Coming to the thirteenth century we find in the mosque of Sultan Kalaoon a desire evinced for increased decoration of the walls, and either by means of stones of varied colours or, that failing, paint is employed, either on alternate courses of the stone or in diaper of various kinds. At the present time in Cairo all the red colour on the buildings is, I believe, paint, but in one or two cases I found a dark-coloured stone employed, though whether that must be set down to its having been painted and washed out I do not know. In Damascus, however, the Great Khan of the seventeenth century is decorated

with alternate bands of black and yellow stone. In the mosque of Sultan Hassan red bands are employed to emphasise the main constructive features only, such as the jambs of the great portal, the voussoirs of the great arches inside, and the square panel round the windows.

At a later period, as in the mosque of Sultan Berkook and El Ashraf, we find the bands of red alternating in even courses with the uncoloured stone. This is not, however, common to all the mosques, for at a still later date we find them trusting to a decorative moulding, which is the most characteristic feature of the Saracenic style in Egypt. It consists of two beads sunk in the stone with hollow between each, constantly interlacing,—sometimes crossing once and sometimes twice, and then enclosing a hexagon. There is an infinite variety of examples of this decoration in Cairo (Ill. 8). Occasionally, as at Sultan Hassan, there is no cornice to a Saracenic building, the roof is flat and a kind of cresting is carried round, which is of the most varied form. Below this is a small string-course of slight projection.

The absence of a cornice is in many buildings compensated for by the introduction of the stalactite corbelling between flat piers or buttresses, which from the thirteenth century are invariably adopted as a method of breaking up the wall surface; in the case of the wall enclosing the mosque proper these buttresses occur about 10 feet apart, and are carried up the whole height of the building, with windows between lighting the ground and first floor (for galleries exist in most of the mosques).

In Persia (as I have already pointed out) the decoration consists of a veneer of glazed bricks or tiles, broad bands of which surround all the chief features, enclosing the portals and windows in squares. Variety is obtained either by the alternating of ornament and Cufic inscriptions, or by the employment alternately of white on blue ground or blue on white ground, and occasionally the use of other colours, as green, yellow, and red.

In India they adopt similar treatment in brick buildings; in their stone examples sometimes they cover the whole surface in ornament of a similar kind—a process either adopted from Persian models, or a relict of the custom of the earlier Indian



8.—DOORWAY OF PRIVATE HOUSE, CAIRO.



builders to cover the whole surface of the wall with sculpture or carved ornament. In work of later date, the walls of white marble were inlaid with an infinite variety of ornament in black, examples of which may have been seen in Verestchagin's paintings of the Pearl Mosque and the Taje Mehal. In Syria the same custom obtains as in Egypt, except that they have a greater partiality for black in the place of red lines. In Turkey the tendency is to black lines of colour and generally of marble.

All this refers to external decoration: when we come to the interior of the mosques and palaces, they revel in every variety of colour decoration, both of material and painted. The columns are of marble and porphyry, the walls, or at least the lower portion of them, are lined with slabs of marble or glazed tiles of infinite variety. The inscriptions above are cut in stone or in plaster, with Cufic characters and interlacing ornaments; as a variety to the plain slabs of marble, we find sometimes, as in the mosque of Sultan Hassan, and in the Great Mosque at Damascus, panels filled with special designs in inlaid marble, which form a very beautiful series of examples.

All these, however, at first sight pale into insignificance before the painted decoration of the Alhambra, in which gilding forms so important a feature. I confess, however, that this exuberant richness of design, in the plaster work and painted decoration of the Alhambra, palls upon me, and an inspection of Owen Jones's work on the *Alhambra* and the magnificent court he designed and erected at the Crystal Palace causes me to turn with relief to the simpler, but more real decoration in stone, marble, and tiles, which is found in Egypt and Constantinople.

The principal decorative features of Mahometan architecture are:—First, the Entrance Porch; second, the Minaret; third, the open Loggia, which frequently forms the pendant to the minaret; and fourth, the Dome.

### I. THE ENTRANCE PORCH.

The entrance porches acquire their monumental character by the simplest of means, viz., their arrangement as a recess or niche, which rises the whole height of the building, vaulted

with pointed semi-domes, and enriched with stalactite vaulting, and painted in brilliant colours. In Egypt the arch-opening is cusped, which leads to a sub-division of its vaults into various forms, in which semi-domes and barrel vaults (both slightly pointed to accentuate the apex) intersected; to these I shall refer later on. Within these niches or portals, the doorway, windows, and decorative features, which give the scale to the portal, are placed; and being thus protected from the rain they are decorated with inlaid marbles and low relief ornament in great profusion. One of the earliest instances of this type of portal I am acquainted with in Mahometan work is that of the mosque of Tabreez in Persia, to which I have already alluded.

In India this feature acquires increased importance from the fact that the portal, with its supporting wings, and crowning features, rises to a greater height than the main building itself, except the dome.

Fergusson, in speaking of this feature, observes, "The Gothic architects attempted something of this sort by making the outer openings of their doors considerably larger than the inner; in other words, by splaying widely the jambs of the portals. By this means, in some of the French cathedrals, the appearance of a very large portal is obtained with only the requisite and convenient size of opening; but in this they were far surpassed by the architects of the East, whose lofty and deeply-recessed portals, built on the same plan as at Tabreez, are unrivalled for grandeur and magnificence."

Fergusson also instances the portal of the palace at Mashita in Mesopotamia as suggesting the feature; but we may go even farther back than that. The great portal of Tak-Kesra, at Ctesiphon, A.D. 550, is much more characteristic of the type than Mashita, though the recess is much deeper here; and the arch of Firouzabad is the natural consequence of the arch of the palace of Al Hadhr, which is based on the triumphal arches of the Romans. The great portal at Futtehpore Sikri, already referred to, is semicircular in plan behind the thickness of the front wall; in its rear it is divided into three levels, archways or entrance doors below, clerestory windows above, and what corresponds to a triforium—a small arcade running between,

which gives scale to the features above and below and, consequently to the great portal enclosing them all, the whole being covered by a semi-dome with stalactite pendentives; the four-centred arch here is more accentuated than usual and it is surrounded with the same rectangular frames that we find in all Saracenic buildings. So far it resembles the mosque at Sultanieh, but the Great Porch at Futtehpoore Sikri is crowned by a gallery of thirteen arcades equal in size, probably, to the arches of an ordinary mosque, each bay being vaulted and crowned with a small dome; furthermore, the angles of this block are enriched by octagonal shafts rising above the arcaded gallery and terminating with a finial. On either side, set back the thickness of the wall at an angle of 45 degrees, are two wings of less height than the centre portal, in which we find, again, the three levels, small entrance portals or windows, a pointed arch niche above with triforium arcades between, again giving scale to the larger features. These side wings are crowned with the Saracenic cresting, equivalent to our battlements, and the skyline is further broken and scale given by a series of domes carried on octagonal lanterns on the roof. It is difficult, of course, to describe such a building adequately, but it contains the first principle which should be observed in all monumental design, and with which architects of all periods have constantly been struggling, first to obtain grandeur by the introduction of large features; secondly, to give scale to these features by subordinate ones. The interior of the church of Sta. Sophia, at Constantinople, the west fronts of many of the French cathedrals, and the west front of Peterborough Cathedral, owe their magnificence, as it seems to me, to a due observance of this great principle.

## 2. THE MINARET.

The minaret or tower from which the muezzin, or call to prayer, is chanted, dates from the twelfth century. The earliest type, called a mabkhareh, is found in the mosque of Tooloon. The lowest portion only may have been erected for defence, though Murray states that the upper floor was used for burning incense during the hour of prayer, which escaped through numerous apertures in the walls.

The minaret proper has one or more balconies from which the muezzin is chanted. In Egypt the lower portion of the tower is square till it reaches the parapet of the wall of the mosque; it is then changed to an octagon, sometimes with a plain cant, sometimes with mouldings set back, and sometimes with a broach. The first octagon storey has openings in each side with projecting balconies in front (Ill. 10). The balcony of the second storey is corbelled out in stalactite vaults and stone balustrades, and the second floor is set back to give further space to the balcony. The balcony of the third storey and the setting back is similar, and the crowning feature is of a bulb-like form. In two or three cases the feature is doubled (Ill. 9), and in one case are four minaret turrets and bulb finials. The decoration of these three storeys is of the most varied and beautiful description, horizontal bands of different coloured stones on diverse interlaced patterns reminding one somewhat of the brick Elizabethan chimneys. The balustrades of the earlier and better minarets consist of vertical posts of stone with marble slabs between pierced, a direct descendant of the balustrades adopted in Byzantine architecture.

In Syria and Palestine the minarets, as a rule, have one balcony only at the top, which is sometimes covered over with a pent-roof.

In Spain the well-known example of the Giralda at Seville is a square tower, with its surface divided up and the panels enriched with Moresque ornament. The upper part of this tower is of Renaissance date, but probably represents the original form of the crowning feature, viz., two towers or turrets, each set back to allow of the upper balconies.

In India, curiously enough, the minaret does not form so essential a portion of the earlier mosques as in other Mahometan countries, although examples of a similar kind, built as towers of Victory, are to be found in the Minar at Ghazni, A.D. 977, and the Kutub, at Delhi, A.D. 1220. Isolated minarets are to be found here and there, attached to small mosques, but in the great mosques they are either attached to and form part of the central gateway, or are grouped as pendants to the domes. In the Taje Mehal, however, they form distinct features, and are placed at each angle of the terrace of the great tomb.





9.—MINARET OF MOSQUE OF THE EMIR YAKHÓR.



These minarets taper slightly from bottom to top, and are divided by overhanging balconies, and crowned with an octagon lantern, covered with a cupola. They owe their beauty probably more to their material, white marble, and to their surroundings than to their design.

In the Great Mosque at Delhi these minarets approach more to the forms of those in Constantinople, the least satisfactory form with which I am acquainted.

### 3. LOGGIA.

The loggia, which forms a pendant to the minaret (Ill. 3), though it is found elsewhere, is simply a reproduction of arcades similar to those inside a mosque, viz., two or three arches carried on columns, a balcony between, and a projecting hood to keep the sun off. This loggia, raised on a plain ground storey, is also the chief monumental feature in the interior courts of houses, and in other similar buildings, as, for instance, the court house at Cairo.

### 4. DOMES.

The dome is the one characteristic feature *par excellence* which the Mahometans seem to have made their own, though derived in the first instance from Byzantine domes. As I have before observed, it is not part of a mosque, but of a tomb, exception being made in favour of the mosques of Constantinople, all based on Sta. Sophia.

The earliest example existing is probably the tomb of Zobeide in Persia: there was one at Tabreez, but it is gone. The tomb of Sultanieh, in the beginning of the thirteenth century, is an early example, and there it is of a simple pointed form, with its springing on the level of the main cornice. In Egypt the earliest dome is that of Sultan Hassan, the springing-line of which is also on the same level as its octagonal base. In later examples it is raised on a vertical drum, which is described by Mr. Poole in his work on Egypt. The raising of the upper portion to a point is evidently done from constructional reasons. The beds of stone are horizontal to a certain distance, the upper portions only, I believe, having their joints at right angles to the external surface. Whether, as in the gate of the Jumma Musjid, there are layers in which the beds are part

horizontal and part running to the centre of the arch I have been unable to ascertain.

The stone domes of Cairo (Ills. 3 and 10) and Syria are

decorated in various ways with beautiful flowing Arabesque ornament, and probably carved *in situ*. The domes in brick are covered with stucco and adorned with ribs in vertical planes, sometimes, however, at the base interlacing with one another. The cylindrical drum on which the dome rests is pierced with windows, the whole being placed on a square tower with the corner angles canted off to form an octagonal base for the dome. In the interior these corners are supported by the pendentives, which, with their stalactite design, will be referred to later on.



10.—Mosque of Khair-Bek, Cairo. 1520 A.D.

In modern Cairene domes the bulbous form is adopted.

In Spain the dome is of small size, and invariably covered with tiles, sometimes glazed, and of various colours.

In Persia the mosque of Teheran shows a marked acceptance of the bulbous dome which in India seems to be the result of a constructional requirement, viz., the counterpoise weight to

the thrust of the upper portion. The subject is one which would be too long to enter into here. Dividing a pointed dome into seven heights, and assuming equal thickness, the relative weight will be 10, 10, 10, 9, 5, 3, 1. The lowest four sections could easily be constructed with horizontal beds. If, therefore, the upper portion be diminished in thickness, and the lower sections increased in weight by adding the bulbous form to the outside, the counterpoise might be so increased as to be able to resist the thrust of the upper portion. However, this is only a surmise on my part, which may have given origin to a form pleasing to the eyes of these people, who delighted in the bulbous form. The most remarkable construction produced in Indian examples are those of the mosque of the Jumma Musjid and the mosque of Mahmud at Bijapur. Fergusson in his work on Eastern architecture, and in various papers he has read at the Institute, has entered so fully into their construction that I need not enter into it here, except to remark that his theory as to the resultants of the thrust of the diagonal arches being carried into the walls of the tomb of Mahmud, are not realised in the earlier example, the Jumma Musjid, where the comparatively slight resistance to thrust that could be given by the small piers and adjoining arches suggests that there would be great excess of strength in this tomb; except that the difference in diameter of the two might require it, in the latter 51 as against 97, the diameter of the rings of the dome. Instead of throwing the arches to carry the pendentives at 45 degrees across the angles, the ribs are taken across to the second pier, and thus intersect one another, forming an extremely ingenious form of construction, of the principles of which Mr. Emerson availed himself in his design for the Liverpool Cathedral.

In Constantinople the form of the dome was based on that of Sta. Sophia, and as far as the development of that feature (the dome) is concerned, it is a matter of regret that the Turks obtained possession of Constantinople at too late a period in civilisation to develop it. Even the mosque of Mohammed Ali, 1830—1885, at Cairo, based on Sta. Sophia (though so badly built that it is already showing signs of ruin), in general

internal effect, the dome is so fine that we regret that the feature was not more often adopted.

I have already pointed out the claims which Mahometan architecture has to be considered as a style resulting—from the precepts laid down in the Koran—from the requirements of the religion as regards plan of the general design of the architecture and the special form given to its features, whether constructed by Copts, Christians, Armenians, or the Indian people. I have now only to point out the same similarity in their details whether found in the far east of India or the west of Spain.

The details I mean divide themselves into two divisions: first, those arising out of constructive necessities first, though subsequently made decorative; second, those which are simply decorative. The latter are so amply treated in Coste, Bourgoin, Girard de Prangey, Prisse d'Avennes, and other authors, that I intend to pass them by and confine myself to the first class—first, the capitals of the columns; second, the arch, round, pointed, horseshoe, cusped, and trabeated; and third, the stalactite vault.

The Romans seem to have left such an enormous number of capitals, which the Mahometans adapted to their own buildings, that even as late as Sultan Moyed we find examples being still used up.\* In the mosque of Ibn-Tooloon, however, we find an original treatment applied there, it is true, to engaged columns only. The capital changes from round to square forms, and is covered with Saracenic ornament. The true Mahometan capital is a development of the stalactite character, and is designed on the correct principle from a circular shaft to a square cap, the width of which is the same as the thickness of the wall it carries and wider than the diminution of the shaft—a true Byzantine principle.

In India the column is a rare feature; its place being taken by piers, and there is no distinctive capital. There is, however, the engaged column, which is treated similarly to the examples above quoted at Ibn-Tooloon.

The arch is the feature the Mahometans delighted most in. We find it, therefore, of the most varied forms.

The earliest example—if we may accept any of Amrou as

\* See Mr. Wild's explanation of this in the discussion.

being old, or being copied from old examples—is circular-headed, with a slight return inwards, suggestive of the horseshoe arch. My impression is, however, that it has a special object. The lower or vertical part of the arch, the pier on which it rests, is wider than the thickness of the arch in order to receive the cross arches, and the lower part of the arch is brought out to meet it. In later examples it is brought out on two sides of the piers, and takes the place of the abacus in Byzantine examples. Mr. Carpenter suggests that the re-entering curve of the horseshoe arch is a recognition of the Byzantine abacus, which, as we know, is probably derived from the entablature above the Roman capital. Some of the arches at Amrou have the upper portion brought to a point by a straight line tangent to the curve, about two-thirds up: this has certainly a constructional reason to prevent the upper voussoirs from slipping down. The resistance to thrust of these arches at Amrou is obtained by wooden beams inserted above the capital, and henceforth these form an essential feature in all Cairene mosques. The arches at Ibn-Tooloon are the first genuine Mahometan arches. They are pointed arches, with the springing raised above the capital, and a slight return inwards suggesting the horseshoe arch. Later on in Cairene work we come to the trefoil arch; not, however, as an independent arch, but as part of a niche, and this is the favourite form throughout the fourteenth, fifteenth, and sixteenth centuries.

In Spain we have the typical horseshoe arch, with and without cusps, in the mosque of Cordova, with a singular arrangement there apparently to eke out the height (the columns and capitals having been taken from earlier buildings) of a second tier of arches above the lower arch, and in the richer portion of cusped arches thrown across. The arrangement of these arches in one sense takes the place of tracery, and I am astonished the feature has not been employed in later times. It affords another example of that which is common to all styles, viz., the adoption of a constructive expedient to decorative forms. The intersecting of these arches suggests a simple decoration, which forms the chief feature in the Alhambra. This, however, is only a conjecture on my part.

In India the arches are either simply pointed arches, as in Gaur, or pointed arches with the upper portion straight, as at Delhi, or a four-centred arch, the lower curve of small radius, the upper curve very large, or they are trefoil-cusped, or with a much larger number of cusps.

The cusped arch, however, is not introduced as a constructive, but as a decorative, feature.

The last form of arch, if I may so term it, is the straight arch, with voussoirs, of which so many examples are found in Cairo.

The decoration of the Mahometan arch is either confined to simple voussoirs, with a string or hood-mould round; to voussoirs of various-coloured stones, or painted to resemble them; or to surface decoration in plaster, as in Ibn-Tooloon; to surface carving, as in the architecture of India; or to glazed bricks or tiles, as in India and Persia. There is, however, a very important feature, the elaboration of which is pushed farther than in any other style, showing how the Mahometans delighted to play with constructive features: the chief reason for this being that they were forbidden by the Koran to copy nature in any form, whether animal or vegetable.

We are acquainted with the simple method by which in Romanesque work the voussoirs were prevented from slipping by a joggle or a rebated joint. The Saracenic architects, however, went much further than this, and the line of junction is composed of a series of curves so varied that it is to be wondered at how the voussoirs could be fitted together. There are many cases in Cairo in which it can now be seen that this intricate marble design is only a veneer, but there are others in which the thickness of the voussoirs is equal to the set-back of the arch, viz., from 4 inches to 6 inches. How it was possible to put these voussoirs together, and to fit them one into another, puzzled me, until I saw an example in the possession of Sir Frederick Leighton, P.R.A., in which the face only is worked to the pattern, the back being cut away. In this case, I presume, the hollow spaces at the back were afterwards grouted with liquid mortar.

These voussoirs, with the elaborate joggles, are generally found in the arches enclosing the kibleh, or mihrab, which





11.—MOSQUE OF KAIT BEY, OUTSIDE CAIRO, SHOWING THE KIBLEH (MECCA NICHE) AND THE MIMBA (PULPIT).



indicates the direction of Mecca. The illustration (Ill. 11) is from the mosque of Kaït Bey, outside Cairo. The mimbar, or pulpit, has this peculiarity, that the entrance-door and steps face the congregation. The mollah, or priest, sits on the top step and leans on a short stick, with a small horizontal cross-piece about 4 to 5 inches long, made of bronze or ivory, and addresses his flock on one side or the other. This illustration shows, also, the frieze which is decorated by verses of the Koran in fine characters, interspersed with constructive ornament. On the extreme right one of the windows shows the ordinary type of glazing to which we have already referred, moulded stucco taking the place of our lead lines.

I come now to the last section of my paper, that which deals with the feature known as the stalactite vault, a feature which characterises Mahometan architecture, and Mahometan architecture only, throughout the world.

I have long had a desire to study this subject and to endeavour, if possible, to trace its origin and development, and I only arrived at the theory which I am about to propound to you some three weeks ago. My first task was to read up the various authorities on the subject to see if they could give me any clue.

Prisse d'Avennes, in his *L'Art Arabe*, informs us that without doubt these vaults are built in imitation of the internal anatomy of some bulbous fruit (*pépin*), which may be the pomegranate, a theory about as probable as that which maintained that the vaults of Gothic churches were copied from groves of trees.

Kugler describes it "as a peculiar kind of architectural structure of which the striking effect may be attributed to its apparent constructive value and also to its organic (in the ideal sense) and fanciful character as a decoration. It occurs as a transition or interposed ornament supporting overhanging members of the edifice; for instance, as fitting up the internal angles where a cupola rises above a quadrangular space, and in various other instances it is used in certain places as a substitute for a complete arch and vault. It is an artificial system of projecting parts in which small brackets alternate with little niches with pointed arches, in such a way that the base of each superimposed bracket is over the centre of

the niche below, and often so that the upper projection hangs over like a fir-cone."

Schomoranz distinguishes three varieties—Arab, Persian, and Moresque—each displaying certain peculiarities, resulting from character of materials, wood, alabaster, terra-cotta, and stone.

Bourgoin speaks of them as "stalactites in projecting corbels, in vaults or pendentives, carved in stone and superimposed in courses, or else cut in wood and placed in juxtaposition in prisms, or worked in imitation of stone; they are constructional and ornamental, being features (*motives*) of form, their complete study should involve their setting out."

Ebers, in his work on Egypt, gives the following description, which is a literal translation from the German edition: "Also the singular Arabic, peculiar to the style and of frequent occurrence, stalactite ornament which connects the vertical with the horizontal members of the building in such a charming manner, and the fantastic form of which as there found does not appear in any other style."

In the translation of Ebers's works into English (which is by a lady, by the way) I find the following delicious rendering of the phrase: "We do not meet elsewhere with the peculiar Arabic and very frequent stalactitic ornament which is such a charming compromise and connecting link between the Flamboyant and the Perpendicular." Fergusson, in his *History of Eastern and Indian Architecture*, gives a woodcut made from a sketch by him of a stalactite pendentive from the mosque at Old Delhi (which may date from 1220—1230), where the angle is fitted up with a number of small imitations of arches bracketed out one beyond another; and he further adds, it was this form that was afterwards converted into the honeycomb work of the Arabs in Spain. He is no doubt referring here to the Alhambra, but that palace was not commenced till 1272 A.D., and the internal decoration, including the stalactitic vault, was probably not erected till 1340 A.D. There are earlier instances to be met with in Egypt of a purer and more elementary form. Besides that, the way it is employed at Delhi is quite different from the principle of its formation in the pendentives of Egypt and Persia and Spain. In fact, it forms a parallel to the arch which I have described at Delhi. The Mahometan invaders

insisted upon an arch as being part of the faith, and the Jaina builders erected one on their own trabeated principles, with straight joints, getting over the difficulty of the apex in the best way they could. So in this instance of the mosque at Delhi the pendentive is not curved on plan, but forms a corner bracket only, which is characteristic of Jaina architecture.

There are also other features of Jaina architecture (as Mr. Purdon Clarke has pointed out to me) which bear a singular resemblance to stalactite vaulting. The Jaina builders roofed their buildings with stone slabs; when, however, the bearing between the piers was too great to allow of their obtaining stone slabs sufficiently large, they reduced the bearing of the central span by carrying beams of stone across the angles in horizontal courses one above another, eventually reaching a span of sufficiently small size which could be covered by a single slab.

To lighten these slabs they cut out the soffit in semi-coffers, which when multiplied, on looking up at them, have certain resemblance to stalactite domes. I am convinced, however, that this is not the origin.

The result of my inquiry, which I venture to offer for your consideration is this: I have always been of opinion that stalactite ornament had originally a constructional origin, and I endeavoured to trace its development in Cairene structures, where they are, for the most part, worked in stone. I noticed that some of the portals were extremely simple in their forms, and that the sphere and barrel vault intersected by one another, and by plane surfaces, constituted the chief elements. Beginning, therefore, with these, I tried to sub-divide them, and introduce the varied forms which we see in the vault of the portal of the mosque tomb of Sultan Berkook (Ill. 13). I could not, however, evolve these out of the simple forms above mentioned. I came to the conclusion also that these elaborate stalactite vaults were really not constructive, but decorative, and that, therefore, they must originally have been copied from features in which the construction was effected in smaller materials. Now in Egypt, the Pyramids and other buildings were too valuable a quarry, and too near to Cairo to warrant the employment of brick. I turned, therefore, to Persia, and,

among other buildings, to the mosque of Tabreez, before referred to, where I found the stalactite vault built in brick and fully developed. One of the principal problems there solved was the transition from the square to a circular feature carrying a dome, and as this is done in each example by the feature known as a pendentive, I tried to work out the problem from that. It is evident that some centuries must have passed before the complete development of it at Tabreez and Sultanieh was carried out, and then there came this unfortunate dilemma with which I have already acquainted you, viz., that the history of the Mahometan styles in Persia for the first six centuries of the Hejira is a blank, with two exceptions to which I shall refer later on. The tradition of building, however, in the East, is carried on from year to year, from century to century, so that on an examination of their later methods of building in brick, we may fairly assume it is not altogether different from that which existed in the eighth and ninth centuries. Now, the most constant method of building the lower portion of pendentives in Persia and India (where brick and plaster are the sole materials) consists in the formation of a series of small arches one above another, and following the curve of the pendentives. Before, however, entering into this question, let me direct your attention for a moment to the pendentive, and the two principal forms it has taken in ancient times.

The pendentive at Sta. Sophia is a portion of a sphere whose radius is equal to half the diagonal of the square on which it rests.

That is, however, not the only method employed in the East, for in the architecture of the Sassanian dynasty, to which I have already referred, in the palace of Serbistan, built 350 A.D., we find another method of getting from the square to the circular, viz., by throwing arches across; and here the pendentive is formed of six arches or orders superimposed.

Now, my theory is that if instead of having a series of concentric arches across the angles, all turned from the same springing, you turn these arches one above another, and place them on the Byzantine pendentive, you arrive at the principle of the forms taken by the stalactite vault (and, curiously enough,

in the dome of the temple in Diocletian's Palace at Spalato, we find this principle carried out in the building of the dome itself up to about two-thirds of the height of the curve, and a pendentive never exceeds that). Now, in the stalactite pendentives of Tabreez and Sultanieh the spaces within the arches are hollowed out in a series of niches, and it is just possible that the peculiar form of the dome of the tomb of Zobeide is owing to its construction of small arches and hollow niches. If so I find in this tomb, which may date from the eighth or ninth century, the proof of my theory. Unfortunately, there is no record of the construction of this tomb, and Mr. Pullan (who was associated with M. Texier) is unable to give me any information thereon. My drawing is taken from Fergusson, who copied it from Texier's unpublished drawings.

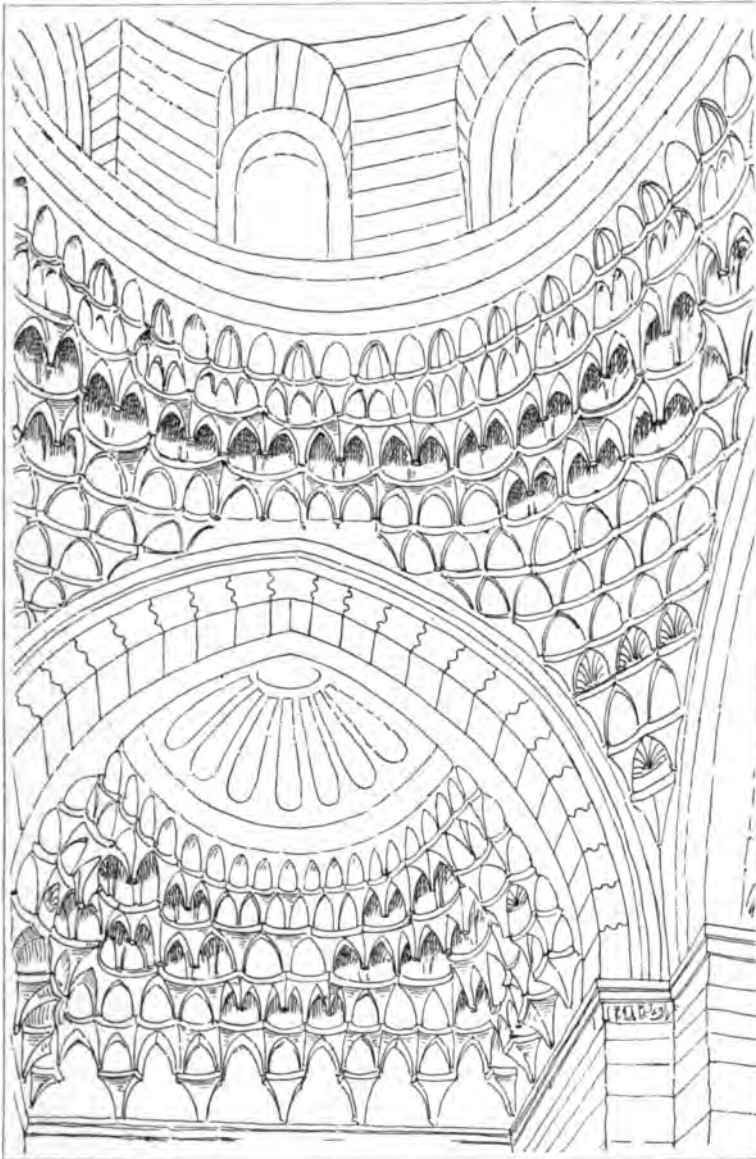
If this theory of mine be accepted, then I have to assume that, although the earliest forms of stalactite were built in this way in brick, subsequently, when they were copied in stone, it was found much easier to build the whole pendentive up solid in horizontal courses, and to cut the constructional forms as a decoration afterwards in the stone. A precisely similar evolution is found in fan-vaulting, which in its origin consisted of ribs of the same curves with web-vaulting between each; subsequently it was erected solid, the ribs being carved out afterwards.

With this theory in my mind, I paid a visit to Mr. Purdon Clarke, at South Kensington, who has seen the modern Persian workmen construct their stalactite vaults in plaster, and he gave me a description of the way they set to work; the example was the decoration of a room with stalactite vaults at each angle and pendant in the centre. The plan was first made out on the floor, the outlines of the several levels being strongly marked out. Then thin slabs of stone were cut to the outline of each level and subsequently built in the wall at the required height. It should be noticed, therefore, that there would always be above the curved form of each course of stalactites an upright vertical surface from  $1\frac{1}{2}$  inches to 2 inches deep; this is the templet. When the bearing of the templets becomes too great, they are supported in the centre by chains from beams fixed above the stalactite ceiling, and in the

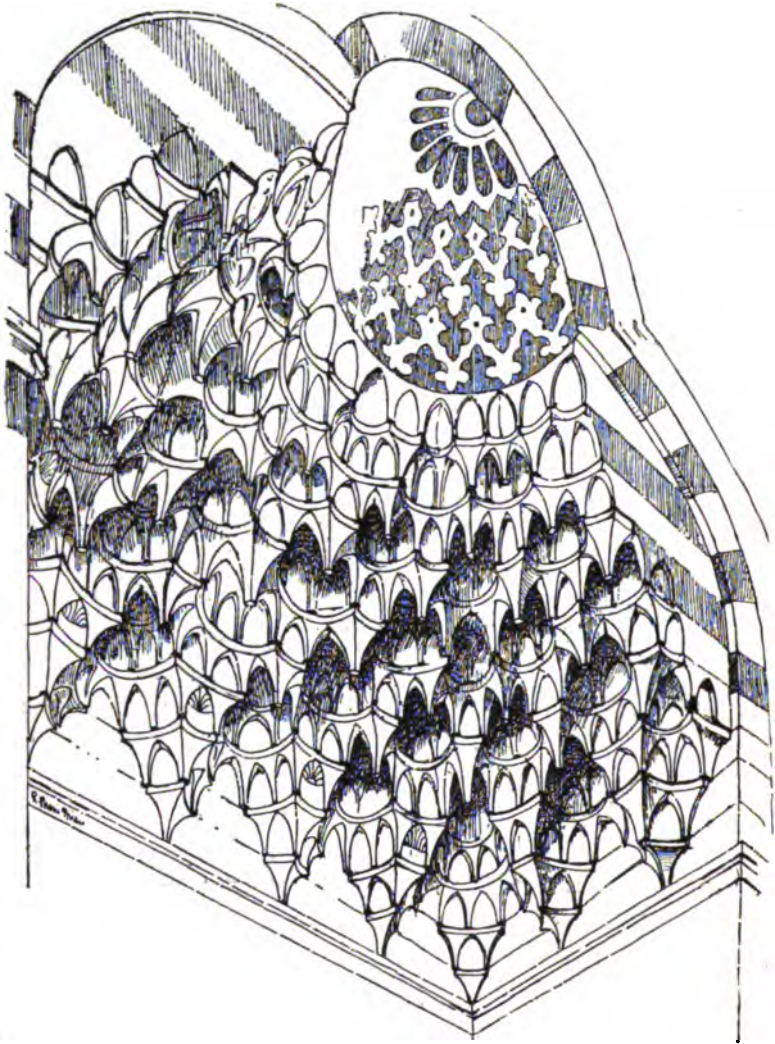
case of pendant stalactites similar chains are suspended to take them. These chains are afterwards coated with plaster to make them rigid like columns. The positions of these templets and chains are carefully ascertained by plumbing from above down to the ground plan. The result will be a series of shelves or brackets, on which the plasterer commences his work, commencing at the bottom and moulding each stalactite niche resting on the lower templet and working it up to the upper one. This description enabled me to understand how the work in Cairo was set out, for applying this principle to the formation of the stone stalactite vaults in Egypt, and assuming, as I have done, that the horizontal courses of stone were carved afterwards, it would be easy to work out the upper surface of each course by means of a templet to the form set out on plan; and it will be observed (see Ills. 12 and 13) that in every case here in the stone vault there is always the same upright or vertical band about  $1\frac{1}{2}$  inches to 2 inches deep to each course, to which I referred in speaking of the modern Persian plaster vaults. When once this was obtained it would be easy either in stone or plaster to work back to the plan of the course beneath, and much easier to leave a stone pendant than to form a plaster one. The pendentives in the bath of Mokoyet, Cairo, and the corbelled balconies of the mosque of Imam-es-Shafeey may be taken as evidences of the dexterity with which these features were carved out of the solid stone. I ascribe these features to the middle of the twelfth century, which is also an evidence of extraordinary preservation.

I should say that the earlier stalactites are much simpler and purer in form than those of later date. The miniature arches are always correct curves struck from a single centre, with a slight flattening of the apex. Whether there was any difficulty in getting the workmen to work to these curves, or whether they thought they might get what they considered to be a better form, I know not, but the later forms are not curved, but consist of a slope and a perpendicular surface. They look hard and unpleasing in comparison with the curved form, and of course naturally as the traditions of the earlier forms died out, we find these stalactites carved as a surface ornament, endeavouring by elaboration and multiplicity to make up for brilliant





12.—VAULT AND PENDENTIVE IN VESTIBULE OF MOSQUE OF  
SULTAN HASSAN, CAIRO.

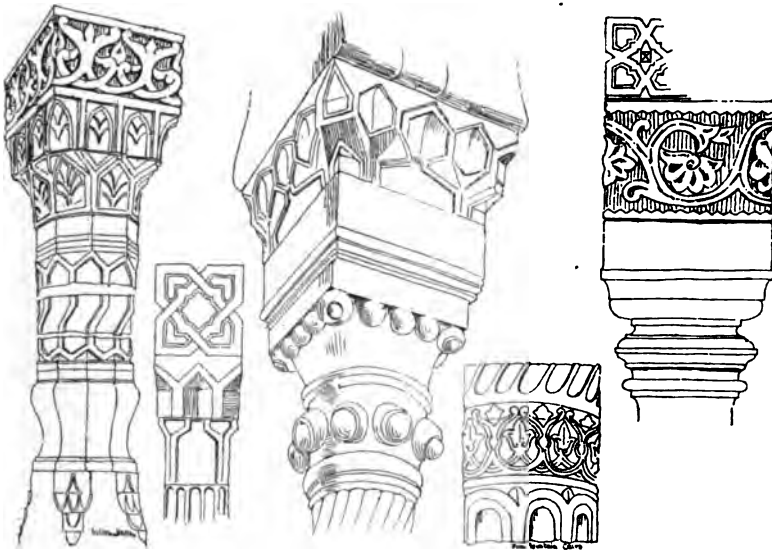


13.—PORTAL OF MOSQUE OF SULTAN BERKOOK, CAIRO.

contrast of light and shade; the greatest decadence being observable in the Turkish stalactite, which has little to recommend it.

Now the pendentive of the tomb of the Sultan Berkook

is the simplest solution of the problem, though of much later date, but there is a want of variety and absence of those deep points of shade which are so necessary in a country where reflected light is so powerful. The next solution I find in the pendentives of the baths of El Ghoree, in Cairo. Here in the upper row but one of arches, the curve of its projection on plan is not quite circular, but enters inwards towards the angle, and a series of five pendants, miniature copies of those in fan-vaulting, are formed. It is easy, however, here to see how this



14.—CAPITALS OF COLUMNS, CAIRO.

could be constructed in the same way, only involving additional labour in the cutting-out of the recess behind them. If, however, in this example you will suppose the beds of stone to have been carried back right to the corner, and to have been carried back farther and farther at each level in descending, until you came back to the corner of the angle, the result will be similar to the stalactite pendentives of the vestibule of Sultan Hassan (Ill. 12), and of the portal of Berkook (Ill. 13).

Want of time has prevented my entering further into the application of stalactite vaulting, not only in pendentives and

domes, and recesses, but in capitals (see Ill. 14), corbels, cornices, and the corbelling out of balconies, &c., as also the diversified forms which it takes in wood, examples of which you will find in the various drawings, diagrams, and photographs I exhibit to-night. Taking some of the simpler forms, a former pupil of mine, who passed through Cairo, has sent me some diagrams of two or three vaults he examined carefully, but as he is going to publish them himself, I shall limit myself to a few general remarks. The main forms of the curves in these examples are spheres and barrel vaults, with horizontal or rising apices in order to accentuate the apex. (They are cut afterwards, I presume, to a point, and form entering angles instead of a simple curve.)

An account of the stalactite vault would be incomplete if I did not refer to those of the Alhambra, which Owen Jones, at all events, succeeded in reproducing at the Crystal Palace, though I am bound to say their formation is still as yet unintelligible to me. He gives a series of diagrams of the various prisms, which, being applied in a certain sequence, constitute the surface of the stalactite vault in the Alhambra: he omits, however, to describe how the main structure is arrived at on which he places these stalactite dies, and, as in the hall of the Aberranges, there is the most complicated arrangement I am acquainted with, something more is required before I shall be able to understand how he carried out the work in the Crystal Palace.

My conclusion shall be a short one. I have endeavoured to point out that the style which I have selected for my paper this evening is one which merits your attention, first, because it is based on the arrangement of plan required by the religion; secondly, that its main features have followed a natural development founded on its needs first, and secondly on the natural desire for monumental display; thirdly, that its decorative details throughout the world are more or less similar, which is an evidence of their having been curtailed or amplified by the precepts of the Koran; and, fourthly, that whilst its earlier forms were based on constructive problems, at subsequent periods the constructive features thus evolved have been adopted as decorative ones; in this application they have

followed the example of all other true styles. I might, if time had permitted, have called the especial attention of students to one very important lesson, viz., that in Cairo at least the mosques and other buildings are designed to suit the positions they occupy, and I am unable to agree with Franz Bey in his *résumé* of the Saracenic style in that town, quoted in Mr. Poole's work, that the want of symmetry of plan which he alludes to is an imperfection. The plans *are* symmetrical where advisable, but they do not hesitate to place their features where they are required, the result being that their domes and minarets form a more picturesque assemblage than the same features in Persia and India, and are in strict accord with the street architecture, of which they form so essential a part.

According to Mr. J. W. Wild, who took part in the discussion, and had spent much time measuring Saracenic work, the columns found in the mosques of Cairo were nearly all of the same size, whatever might be the height and width of the arches they supported, deficiency in height being made good by adding to the abacus above the capital, and by stiling the plinth under the base. These columns are of veined white marble, and of a debased kind of Corinthian order; and he thought they might have come from the ruins of Alexandria, where even now remains of the ancient city are found, in the now deserted space around it. But afterwards at Seville he found in several courts of houses, built about one hundred years ago, columns of much the same kind, but with capitals of a Gothic character, which he should have taken to be of the thirteenth or fourteenth century. The Consul, however, informed him that they came from Carrara into the yards in quantities, and were used up as required, and that the same model always was followed. This appeared to throw some light upon the columns at Cairo, which, as was well known, had always a large commerce with Italy. No marble is found in Egypt, but great quantities of Italian marble have for centuries been used there for pavements, lining of walls, &c., chiefly of the kind which comes from near Carrara. So that it appears probable that these columns in the mosques of Cairo were shipped ready made to Egypt from Leghorn.

## STALACTITE (HONEYCOMB) VAULTING:

### ITS ORIGIN IN SARACENIC ARCHITECTURE.

ARCHITECTURE has always been considered as a creative art in opposition to painting and sculpture, which are imitative arts. This is true only in a certain sense. In the first stage architecture or the art of building is creative. I mean to say that in building, forms are invented and introduced, which are not found in nature; in a second stage these forms are copied, and sometimes in a different material: one in which they were not constructively necessary. Architecture then became imitative—imitative, however, not of nature, but of her own creations.

The earliest instances of imitation are found in the rock-cut tombs near the Pyramids, where we find the battering wall, a form derived from crude brick dwellings where the very imperfect power of resistance to crushing, possessed by unburnt bricks, necessitated a greater thickness of wall at the bottom. The lintel of the doorway in these tombs is of circular form in section, and is copied from the trunks of palm-trees which are used in crude brick buildings to carry the superstructure. The ceilings of these tombs are similarly copied from the rows of palm-tree trunks which in the original type supported the roof of earth and mud. These imitations can only be clearly traced, because to the present day the dwellings of the Fellaheen are built in a similar way with unburnt brick, and with palm-trees as lintels to the doorway and supports for the roof.

In the tomb of Beni-Hassan, 2020 B.C., features are cut in the overhanging rock above the architrave in imitation of the rafters which carried the projecting eaves of earlier constructed dwellings. Subsequently in Greek architecture these rafters,

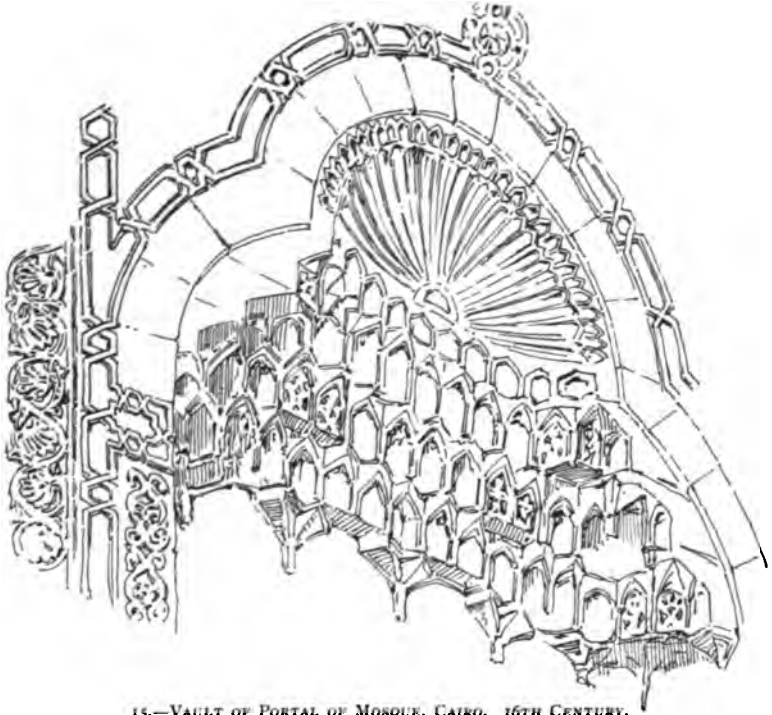
placed closer together, suggested the dentil, and the ends of larger beams below, the triglyphs.

In the Lycian tombs now in the British Museum, we again find, cut in stone, clear imitations of wooden forms, coupled with a curved roof suggestive of the employment of some pliable material such as the bamboo.

In a paper contributed to the Journal of the Royal Asiatic Society and entitled *Some Suggestions of Origin in Indian Architecture*, Mr. William Simpson has pointed out that a wooden origin can clearly be traced in the Chaitya caves of the Buddhists—the form resembling the toda mant, or hut, the construction of which, he says, may have existed in India two thousand years ago. These huts are built with bamboos fixed into the ground in rows, the rows being 6 feet apart; they are then bent over and tied in the centre to a ridge, and are further strengthened by horizontal bars or purlins on which branches or grass are laid. These forms have apparently been copied in stone, so that in the Chaitya cave at Nassick for instance, illustrated in Fergusson's *History of Indian and Eastern Architecture*, p. 115, we find reproduced the curved form of opening and the purlins carved in the solid rock, whilst the surface of the rock is carved with similar forms introduced as mere ornament. There are besides many other forms in Indian work derived from wooden construction, notably that known as the Bengal roof—a curved form derived from bamboo construction, which from 1650 A.D. became a favourite feature in Indo-Saracenic and other Indian styles. In our own Norman style, and throughout the architecture of the middle ages, innumerable instances exist of imitations of forms first used in wood or brick construction, and afterwards copied in stone and in other materials. These evolutions have taken place in what are known as the true styles. It is not necessary to point out how the Renaissance teems with these imitations which become copies of copies, so that it is difficult to determine their origin. This prelude must be looked upon as an introduction to the subject of this article which purposes to deal with a certain form of decoration employed in Mahometan architecture, and known as the Stalactitic or honeycombed vault.

This vault, of which I give a sketch in Ill. 15 of one of the

later and more debased examples in Cairo, is to be found throughout the world wherever the religion of Islam has spread. In Egypt and Syria it is generally carved in stone or wood, in Persia and India it exists in brick and stone, and in the Alhambra, in Spain, in plaster. Many attempts have been made to define its origin. Prisse d'Avennes, in his work on



15.—VAULT OF PORTAL OF MOSQUE, CAIRO. 16TH CENTURY.

*L'Art Arabe*, suggests that it may have been copied from the *pépin* fruit, which may be a kind of pomegranate, the section of which consists of a series of small cells; a suggestion about as probable as that which pretended that the Gothic vault was suggested by a grove of trees. Further on, in the same work, he illustrates a tomb at Kerkeh, in which are shown overhanging courses of stone, rising from a square to a circular form, on which a dome might have been placed. It is not clear, however, that this tomb is of very early origin, and if it were it



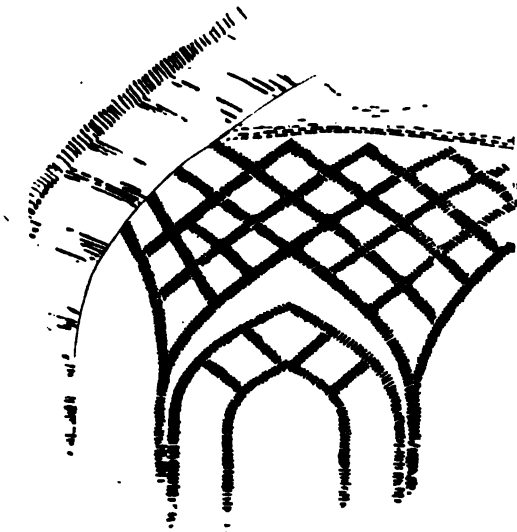
would not account for the series of niches which form the chief feature in the Saracenic vault. M. de Vogüé, in his *Syrie Centrale*, gives a diagram of an imaginary pendentive with small circular-headed niches, which he suggests as an early type. Unfortunately, however, it is not a pendentive in the true meaning of the word, that is to say the courses are not curved on plan, and the niches are semicircular, a form not found in any Saracenic vault known; and furthermore, the drawing is inexact, for if it had been worked out from a plan the small niches would not have had that semicircular form on plan which his projected shadows indicate. No reason is suggested by him why this particular form of decoration should have been employed, there being numerous other ways of enriching the projecting courses by mouldings or carved ornament. Fergusson, in his *History of Indian and Eastern Architecture*, gives a drawing of a pendentive in the mosque of Delhi, in which a series of niches are cut in overhanging courses of stone, and he further remarks that "it was this form that was afterwards converted into the honeycomb work of the Arabs in Spain," referring probably to the Alhambra. The pendentive in this is not a true one, the courses not being curved in plan; in fact, it belongs to the Jaina bracket styles of construction, and only suggests a decorative form without any meaning.\* Its date also (1220 A.D.) is later than that of examples to be found in Egypt, and it does not lead to the elaborate recessing found in the Cairo stalactite vaults.

The fact that in Cairo all these stalactite vaults are built in stone (owing to the proximity of the Pyramids, which have always served as the quarries for the buildings of that city) and that the form of these vaults, if copied from constructional features, must have originated in some country where a small material, viz., brick, only could be obtained, would naturally lead us to Persia, where brick forms, and has formed from the earliest times, the universal method of construction. Unfortunately, there (as Fergusson has stated) the first six centuries

\* Other instances exist in which we find certain forms, such as the arch and dome, insisted on by the Mahometans as features of the religion of their faith, but built by the Jaina builders in their own way, viz., in horizontal courses.

of the Hejira are a complete blank in architectural remains, for, with the exception of two tombs near Bagdad (to which reference will be made later on), the earliest building known is that of the mosque of Tabreez, erected 1294 A.D. In that mosque, however, and in the mosque of Sultanieh, built ten or fifteen years later, will be found types of every variety of stalactite vault all built in brick, and so far developed as to suggest that centuries must have passed before the forms thus arrived at could have been evolved. The traditions of building,

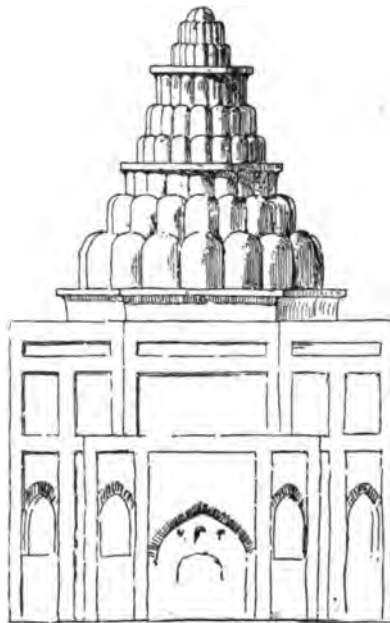
however, in these Eastern countries is handed down from year to year, from century to century, so that it might be fair to assume that if there were found any rough-and-ready methods of building at the present day which might throw any light on the question they are worth consideration. Of these there are two methods still in common practice : one in which brick



16.—PERSIAN SPHERICAL PENDENTIVE.

is used, the other in which plaster is the chief material. The latter will be described further on. Numerous instances of the former are to be found in Persia and India in the formation of spherical vaults or pendentives; a series of arches in brick, interlacing one another, constitute the construction of the vault up to a certain height. The interspaces thus formed, consisting of four-sided panels (Ill. 16) are filled in with plaster, to a uniform surface with the brick arches, to allow of flat surface decorations. The stalactite vault proper, however, has a series of sunk niches, so that it is necessary to go further in our inquiry. Going back to Byzantine architecture, we find in the

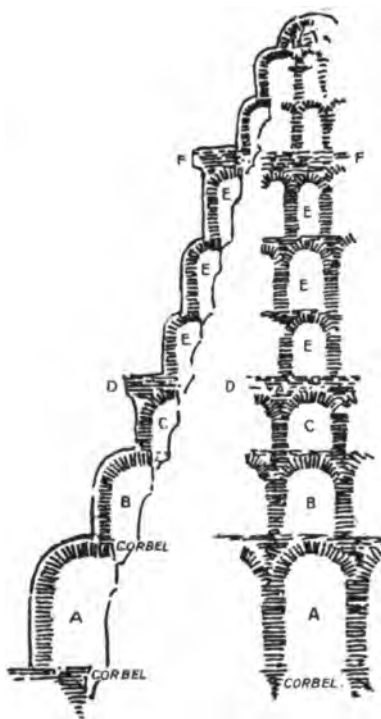
great mosque of Sta. Sophia at Constantinople the finest example of the true pendentive, which is a portion of a sphere. The pendentive at Sta. Sophia is about 60 feet high, and nearly 100 feet from one end to the other. We have no information as to its construction, but, as Procopius states that one of the arches carrying the pendentive gave way owing to the centering having been removed too soon, we may assume that the pendentive was also built with centering of some kind. The object of a pendentive is to rise from a square on plan to a circle inscribed within that square on which a dome is placed. This is, however, not the only way in which the object can be obtained. The difference between an octagon and a circle inscribed is so slight that by throwing arches across the angle of a square, so as to reduce the square to an octagon, a base for a dome is easily obtained. This they seem to have done in the palace of Serbistan built by the Sassanian dynasty, c. 330 A.D. A small arch is thrown across first, and on this a series of five arches or orders, projecting one over the other (the one beneath serving as centering) contracts the opening to an octagon.



17.—TOMB OF ZOBEIDE, BAGDAD.

Applying this system of construction to the true pendentive, if, instead of having concentric arches across the angle, these arches are turned one over the other and placed on the Byzantine pendentive, we arrive at the design of the vaults which are found in the Saracenic stalactite examples; and such a system of construction is found in earlier times—viz., in the Pantheon at Rome (the outer casing), and in the palace of Diocletian at

Spalato. In domes of small span this method of building arches could easily be carried up without centering to the top of the pendentive, or nearly so; above that, however, the projecting over of the cupola vault is too great to allow of it, so that either centering must be employed, or some other means to cover over the space contrived. Dismissing the pendentive for the moment, and supposing it is required to cover over an



18.—SECTION OF TOMB OF ZOBEIDE, BAGDAD  
PARTLY CONJECTURAL.

octagonal or circular chamber of moderate span—viz., 40 to 60 feet—this could be done by corbelling out gradually and building a kind of conical roof, similar in section to the building known as the Treasury of Atreus. This, however, is built in stone, with horizontal courses. If built in brick, a series of small arches, A A (see Ill. 18), might be built standing vertically on corbels of brick; instead of filling them up solid, the filling-in might be carried back on to the wall in the shape of niches. Between these arches the work might be corbelled out again to receive a second row of arches, B B—the plan being an octagon or circle of less dimensions than the first built, which itself was less than the diameter of the hall or chamber on which it was placed. This principle might be carried out for a third series of arches, superimposed, C C, and a bonding course of bricks, D, might be built, spread out on the outside, to form a platform for future work; then a second series of three rows of arches, E E E, and a second bonding course, F, on which it would be possible to start again with a less

octagonal or circular chamber of moderate span—viz., 40 to 60 feet—this could be done by corbelling out gradually and building a kind of conical roof, similar in section to the building known as the Treasury of Atreus. This, however, is built in stone, with horizontal courses. If built in brick, a series of small arches, A A (see Ill. 18), might be built standing vertically on corbels of brick; instead of filling them up solid, the filling-in might be carried back on to the wall in the shape of niches. Between these arches the work might be corbelled out again to receive a second row of arches, B B—the plan being an octagon or circle of less dimensions than the first built, which itself was less than the diameter of the hall or chamber on which it was placed.

number of arches. Finally, the circular span to be covered would be so small that a single dome would cover it.

Now, evidently the scheme of construction just set out has been based on a knowledge of the external form of this tomb of Zobeide, shown in Ill. 17, but it was from a careful consideration of how such a feature could be constructed that the scheme which is here suggested was evolved, and it might be that in each case noted the main part of the niche behind each arch would rest on a solid base beneath—in other words, the centre of gravity of each niche would be behind the front line of the arch beneath, so that it could be constructed without centering. Internally the structure thus formed would present a series of niches similar to those found in the stalactite vault; externally this would form a series of miniature domes. Now, in Europe we should cover these over with a tile roof on rafters and battens; but in the East, on account of timber when unventilated becoming the prey of insects, it has always been the custom to protect the external vaults with cement of some kind, sufficient to keep out the wet; further than that, a dome of some sort being the traditional covering feature of a tomb (if built for that purpose), these miniature domes might be left, and as a matter of fact they were left, and account for the peculiar form of the tomb of Zobeide, a drawing of which is given in Fergusson's *History*, taken from a sketch by Texier, of which I have given a copy (Ill. 17). I put forward my scheme *only* as a *possible* one, but from information obtained from those who have seen the interior of its actual construction, it would appear that of late the tomb has become much deteriorated, and owing to wet coming through the external covering, the tiles and other decoration have fallen in, exposing to view the brick construction of these niches, which accords, so far as I have been able to ascertain, with the suggestions here made. Coming to the date, Zobeide was the favourite wife of Haroun-al-Rashid, who reigned from 786 to 805 A.D.; consequently this tomb dates probably from the end of the eighth century, thus giving five centuries for the subsequent development of the vaulting as found at Tabreez and Sultanieh. There is a second tomb near Bagdad, of slightly later date than the tomb of Zobeide, viz., the tomb

of Ezekiel, which is of similar form, but with one important difference—that the niches are built, not one over the other, but astride between two; and this is the way in which in subsequent developments it appears always to have been built. The tomb of Zobeide being octagonal on plan, there is no necessity for a pendentive. The application of these vaulted cells, however, is simpler than to the dome, and in the developments at Tabreez and Sultanieh the stalactite vaulting cells are applied to pendentives.

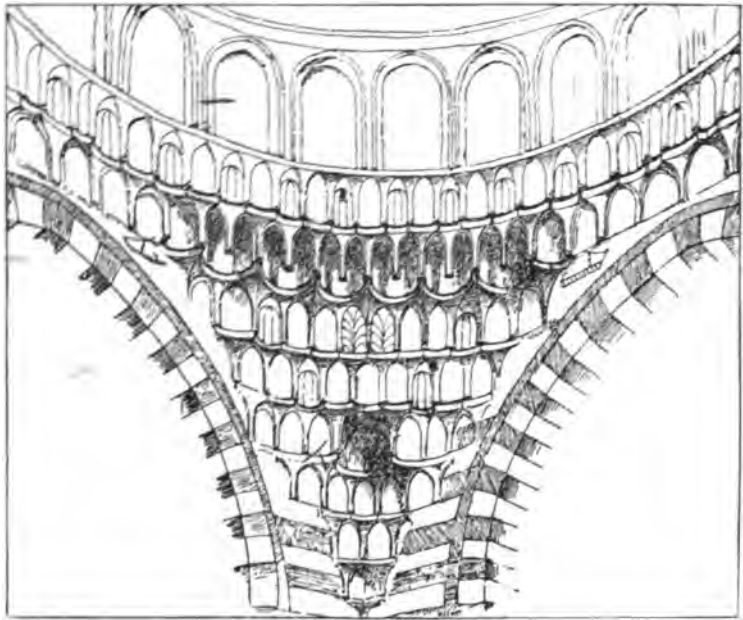
Before proceeding to show how these forms were copied in stone, some reference should be made to the modern formation of stalactite vaults as they are carried out in plaster at the present day, for a description of which we are indebted to Sir Purdon Clarke, C.I.E., who has seen them in course of erection. The example described was the decoration of a room, with stalactite vaults at each angle and pendant in the centre. The plan was first made out on the floor, the outlines at the several levels being strongly marked out. Then thin slabs of stone were cut as the templet of each level, and subsequently built in the wall at the required height. It should be noticed, therefore, that there would always be, above the curved form of each course of stalactites, a vertical face or band, from  $1\frac{1}{2}$  inches to 2 inches deep; this is the stone slab. When the bearing of the slabs becomes too great, they are supported in the centre by chains from beams fixed above the stalactite ceiling, and in the case of pendent stalactites, similar chains are suspended to take them. These chains are afterwards coated with plaster to make them rigid, like columns. The positions of all these templets and chains are carefully ascertained by plumbing from above down to the ground plan. There will then be a series of shelves and brackets, on which the plasterer, commencing his work, begins from the bottom, moulding each stalactite niche from the lower templet to the upper one. The value of this description will be seen when we come to the stone stalactite vaults in Cairo, as it enables us to understand how an apparently complicated vault could be set out from plan with great facility by an Arab craftsman.

Now the earliest example of the stalactite vault, other than

in Persia, is to be found in the "Zisa," close to Palermo. The exact date cannot be ascertained, but it is thought to have been built by the Saracens between the years 941 A.D., when they obtained possession of Sicily, and 1072 A.D., when they were driven out by the Normans. There are three square recessed niches, each covered over with a fully-developed stalactite vault. The material is stone, which abounds in the vicinity of Palermo. In Cairo, all the important vaults constructed are built in stone taken from the Pyramids of Gizeh; and even in the earlier examples, such as in that of the minaret of Imamesh-Shafeey, outside Cairo, said to have been built by Saladin, and therefore dating from about 1210 A.D., the development is complete. As no trace of stalactite vaulting is found in the mosque of Ibn-Tooloon, 877 A.D. (except in the cupola of later date over the mihrab) it may be assumed that its application had not at that period found its way into Egypt; nor is it found in El Hakim, built in the early part of the eleventh century. It is fair to assume, therefore, that when introduced into Egypt, it came in its fully-developed condition, and was adapted by the architects of the Saracens more as a decorative than as a constructive feature. The principle of covering-over spaces by means of horizontal courses of stone, projecting one over the other, has been known in Egypt from time immemorial; the earliest example being found in the gallery of the Great Pyramid. At Abydos also, and in many other places, we find circular barrel vaults constructed in this fashion, that is to say, built in horizontal courses and cut afterwards to the form of the arch. In the baths of El-Ghóree (Ill. 19) we find one of the simplest stages of its Saracenic development.

In speaking of the modern stalactite vaults of Persia, I referred to the method of setting out on plan the stalactite vault about to be constructed. This system of setting-out applies not only to details, but to the whole building, which, according to Mahometan custom is always planned out on the spot by tracing lines with plaster on the ground. It is recorded that when Mohammed Ali, about the year 1830, commenced his mosque in the citadel, he went down to see the plan which had been set out on the ground by his architect; and inquired

what the material was which had been employed to set out the line. Learning that it was plaster, he ordered it all to be swept away and to be replaced by flour, as an emblem of fertility. Now it is easy to see how the plan of the pendentives and lower portion of the dome of the baths of El-Ghóree (given in Ill. 19) could be set out on the ground, and the projection, one over the other, of the horizontal courses of masonry determined by plumbing from above. Further, it should be noticed



19.—PENDENTIVE OF BATHS OF SULTAN EL-GHÓREE, CAIRO. 1504 A.D.

that in this example, and in early ones in Cairo, there exists beneath each niche a vertical band about 2 inches high. This corresponds to the templets referred to in the modern Persian plaster vaults: when once the exact form of this templet was set out on the ground by the master workman, the workmen could be left to cut out the recesses to meet it; in fact, it is a very much simpler process to cut out the recesses in stone than to form it in plaster. The stone pendants also can be formed without any difficulty. The deep recesses might have been set out at first,



or left until the necessity for some deeper shadow led to their being recessed and a pendant left. In either case, it is important to note that the niche or recess is not a constructive form here but a decorative one. These horizontal beds of stone are quite as strong without niches cut in them, and for decoration they might have been moulded, or carved with ornament, as are innumerable examples to be found in mediæval architecture. But the series of niches, possibly symbols of the kibleh or niche showing the direction of Mecca, would seem to have been adopted in the same way as the Chaitya in Buddhism, viz., *decoratively*, as a symbol or emblem of the faith; and what I have endeavoured to show originated from constructional requirements came afterwards to be adopted as a means of decoration.

We may now take a more complicated form—that of the vault of the portal of Sultan Berkook, 1390 A.D., and of this an illustration is given in Ill. 13, showing how gradually the plan of each course of stone, from the semicircular form at the top, comes down to a parallelogram at the base.

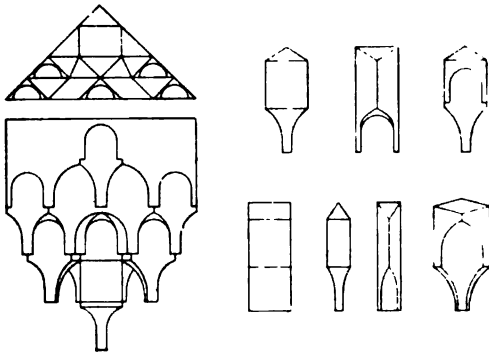
This developed form had already been achieved at Tabreez, 1294 A.D., and Sultanieh, 1306 A.D.; so that it is a development of brick, or brick and plaster, and not of stone construction.

The pure form of niche in the stalactite vault seems to have lasted till the sixteenth century, when, instead of the simple pointed arch with flat apex we find a slope and a perpendicular surface (see Ill. 15). There is also another point to be noticed, the depth of the recess in the portals of the mosques is equal to half the width of its opening; but in the entrances to private houses and khans they try to economise space, and the depth is sometimes one-third or one-quarter only of the width; they are unable, therefore, to obtain the same simplicity of plan. This is made up for, however, by greater elaboration and more carving, and in the illustration (Ill. 15) it will be seen that in a narrow street its variety is likely to be more attractive than in a deeply-recessed one. The stalactitic forms were not only used for niches, recesses, and domes, but were applied in various other ways. In the Imam-esh-Shafeey they are employed for the corbelling out to support the balconies, and there is an endless variety of them in Cairo and elsewhere. The principle

lends itself also to the capitals of columns, examples of which are shown in Ill. 14, for which it is admirably adapted. The earliest form of it may be found in the Imaret or Hospital of Oulou Jami, at Erzeroum in Persia, of the twelfth century. The corbelling back from the square die, carrying the arch to the circular column beneath (whose diameter sometimes is only half the width of die, a true Byzantine principle), constitutes one of the happiest applications of the miniature stalactite niche.

Hitherto I have referred only to the reproduction of the stalactite in stone; once accepted as a decorative feature, however, its paraphrasing in wood and in plaster would be the

natural outcome of its introduction. In these materials, however, it took different forms, and was executed in the simplest way the material lent itself to. In wood, for instance, though sometimes brackets are carved out of the solid, they frequently consist of a series of small pieces of wood



20.—EXAMPLES OF PLASTER CASTS USED IN THE STALACTITE VAULTS OF THE ALHAMBRA.

which fit together like a puzzle. In the Alhambra (where absolute perfection of finish was required, unlike the coarser though sometimes more decorative forms found in Persia) the outer surface of the stalactite vaults are covered with a series of prisms all cast in a mould (Ill. 20) which fit one into the other as shown in Owen Jones's *Alhambra*. These, however, have nothing to do with the origin of the feature, and only show how varied are the forms which the exigencies of construction may involve. The stalactite vaults of the Alhambra date from the middle of the fourteenth century, long after the problem had been worked out in the East.

# SASSANIAN ARCHITECTURE.

A PAPER READ BEFORE

THE ROYAL INSTITUTE  
OF BRITISH ARCHITECTS,

ON MONDAY, DECEMBER 1ST, 1890,

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## SUMMARY.

SASSANIAN ARCHITECTURE THE CONNECTING LINK BETWEEN THE  
ASSYRIAN AND BYZANTINE STYLES—THE DATES OF THE DYNASTY GIVEN BY  
FERGUSSON—DESCRIPTION OF THE PALACE OF AL HADHR—ITS CONSTRUCTION  
AND DECORATION, AND OF THE PALACE AT DIABEK—BOTH CONSIDERED  
BY THE AUTHOR TO BE THE WORKS OF THE PARTHIAN DYNASTY—PALACES  
AT SERBISTAN, FIROUZABAD, CTESIPHON, WITH A DETAILED ACCOUNT  
OF THEIR CONSTRUCTION, DERIVED APPARENTLY FROM ROMAN SOURCES—  
THE PALACES AT TAG-EIRAN, MASHITA AND RABBATH-AMMON—SASSANIAN  
DECORATIVE SCULPTURE AT TAK-I-BOSTAN AND BI-SUTOUN.



## SASSANIAN ARCHITECTURE.

THE completion of two books of importance, both of them adding to the somewhat scanty knowledge which we possess of the architectural works of the Sassanian dynasty, has suggested to me that the subject of Sassanian architecture might be one of some interest to the members of the Institute. The books to which I refer are *L'Art antique de la Perse*,\* by M. Dieulafoy (the discoverer of the enamelled treasures from Susa, now in the Louvre), and MM. Perrot and Chipiez's last volume,† which deals, amongst other styles, with the Persian, and refers to Sassanian work.

Although the Sassanian dynasty lasted only a little over four hundred years (A.D. 226—641), and throughout its duration was perpetually at war with neighbouring and with foreign countries, its builders succeeded in developing a style which possesses certain marked characteristics, interesting from a constructional point of view. It has, however, other claims on our attention, as it seems to me to form a connecting link between Assyrian and Babylonian architecture on the one hand, and Byzantine work on the other. It has a retrospective value as regards one, and a prospective value as regards the other: retrospective if we look upon the vaults of Al Hadhr, Serbistan, and Firouzabad, as the traditional method of covering over space, handed down from Assyrian times: prospective as regards Byzantine work, if the dates given to Serbistan and Firouzabad are correct. But I propose to defer the controversial ground which these latter questions involve. It will probably be sufficient now if I attempt to lay before you all that is known of the

\* *L'Art antique de la Perse: Achéménides, Parthes, Sassanides*. Par Marcel Dieulafoy. Cinquième partie, *Monuments Parthes et Sassanides*. Large 4to. Paris, no date.

† *Histoire de l'Art dans l'Antiquité, &c.* Par Georges Perrot et Charles Chipiez. Tome V., *Perse, &c.* Large 8vo. Paris, 1890.

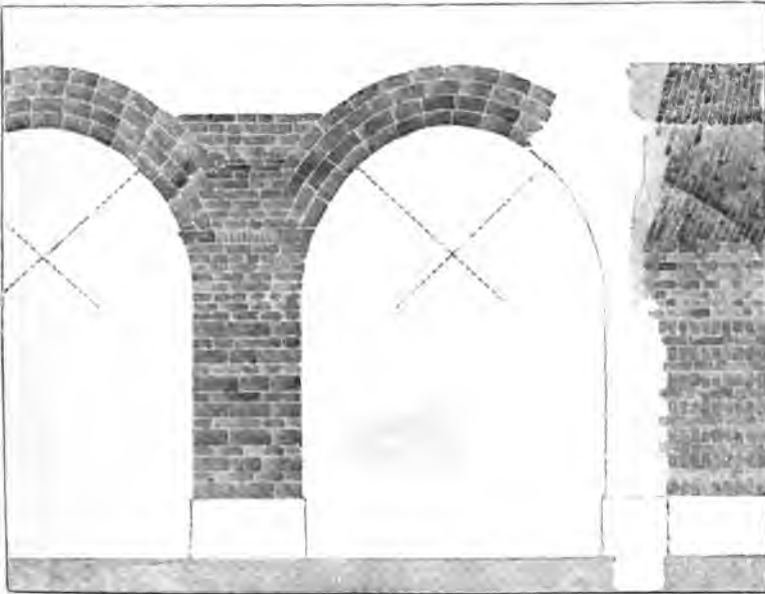
buildings which are said to constitute the Sassanian style. The principal building monarchs, with the dates of their works, may be roughly given as follows :—

- A.D. 226—242.—Artaxerxes, or Ardashîr, founds dynasty, after having overthrown the Parthian monarchy, which had endured from B.C. 250.
- 242—273.—Shahpoor, or Sapor, I. takes the Emperor Valerian prisoner.
- 308—380.—Sapor II., or Sapor the Great, builds Serbistan.
- 458—482.—Peroses (Firouz) builds Firouzabad.
- 531—579.—Khosru, or Khosroes, I. builds Ctesiphon.
- 590—628.—Khosru II. builds Mashita and Rabbath-Ammon.
- 632—641.—Yezdejerd III., who died in 651, ten years after his defeat.

The earliest building classed as Sassanian by Fergusson is that of the palace of Hatra, now known as Al Hadhr. Although only about 30 miles distant from Mosul, there seems always to have been considerable difficulty in visiting the place, owing to the hostile tribes infesting the country around. Respecting it little more has been ascertained than that which was communicated to the Institute in 1846, in a paper by Mr. (now Sir) Henry Layard, which was published in the *Transactions of the Royal Institute of British Architects* in 1890, Vol. VII., N. S. There are also accounts of the ruins, by the late Dr. Ross and Mr. W. F. Ainsworth, in the ninth and eleventh volumes of *The Journal of the Royal Geographical Society*. I have prepared a map (Ill. 21) on which are shown the principal countries occupied by the Sassanians, and the more important cities of the Assyrian, Babylonian, and Persian kingdoms.

The most interesting buildings in the city are those situated in an inner enclosure constituting the remains of the palace. These consist of three large halls and a number of smaller ones, all of which were vaulted; with this precaution—that, being placed side by side, their vaults serve as abutments one to the other, the outer wall at the north end being twice the thickness

of the others. The palace itself is built in the brownish-grey limestone of the country, in regular courses, the stones being said to be closely fitted, which means, probably, with thin mortar-joints. Some doubt, however, seems to exist as to whether there is mortar or cement of any kind; in this respect, therefore, it differs from most of the Sassanian buildings known,



22.—ELLIPTICAL VAULTS IN CRUDE BRICK, THEBES, EGYPT.  
(From Lepsius, and from photographs.)

in which the construction, as we shall see, is of the rudest possible kind, with thick joints of mortar.

Two of the great halls measure each about 100 feet by 50 feet, and the third about 75 feet by 60 feet; their vaults have all fallen in, but in some of the smaller halls the vaults are perfect. They are described as semicircular; if so, they differ from the Sassanian vaults, which are usually elliptical, their doorways being invariably circular-headed. The elliptical or three-centre curve is the form which, at Serbistan and Firouzabad, the arched vaults always take; and it seems to have certain

constructive advantages, to which I shall draw attention further on. Indeed, this form of arch in brick is one of the earliest known. The granaries behind the Ramesseum at Thebes, which, according to Mr. Flinders Petrie, are supposed to be of the time of Rameses II., are of precisely the same elliptical form as those found in Persia and were probably built without centering of any kind, as shown in Ill. 22.

It may perhaps be worth while, even at the risk of a digression, to enter more closely into this subject. The great problem which the builders of old had to deal with was, not so much the difficulty of throwing vaults across spaces, as of constructing them either without centering, or with centres of a slight and temporary character, timber being scarce in the country, and, consequently, of much value. In order to lessen the span of the arch in the vaults of Rameses's granaries, the lower courses of brick are built in horizontal beds, each one slightly overhanging the one beneath. This virtually reduces the span from 12 to 10 feet in this instance. In the construction of the upper portion of the vault the bricks are placed flatwise (the bricks being 12 by 6 or 7 inches, and 3 inches thick), instead of edgewise, so that in the vault—between the successive rings—there is no bond, each circular ring being independent of its neighbour, and from 3 to 4 inches thick only: the object being (as suggested by M. de Choisy) to trust to the greater friction which would exist if the bricks were laid on flatwise, whilst each ring was being built, than if end-on, the customary practice with regular centres. In the case of stone voussoirs, or burnt brick, or tiles, this friction would be replaced by the tenacious character of the mortar; with crude bricks, the wetting of the surfaces with water would probably suffice. But, even then, it might be necessary to have some kind of temporary support, although it were given by a templet only, or by what Viollet-le-Duc calls a *cerce*. The Egyptians, however, went beyond this, for, having erected the end wall, they built the first courses of the arch in a slanting position at such an angle as would enable them to form a single ring without centering of any kind.

A similar method of construction seems to have been found by Sir Henry Layard in the large drains under the palace at



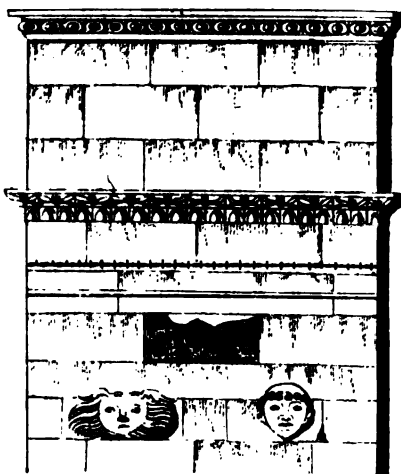
Nimroud; and, so far as I have been able to discern in the palace of Ctesiphon, the rings run in slightly inclined planes, and the bricks are generally, and notably in this great vault, placed flatwise.

To return to my subject: the vaults of the great halls of Al Hadhr have all fallen in, and those in the smaller ones may have been simply covered with circular barrel vaults. A photograph, however, of the interior of one of the great halls would show, looking at the back of the portal, whether the lower courses of the arch were built in horizontal courses; and also whether the curve above the springing had a greater radius than half the width of the hall.

The description given by Ross, in *The Journal of the Royal Geographical Society* [Vol. IX. (1839) p. 468], of the sculpture upon the voussoirs of the arched openings to the several halls tallies with that given by Mr. Ainsworth in the same Journal [Vol. XI. (1841) p. 13]. Referring to the most southerly hall, they say that on every one of the voussoirs of the arch leading into it, there was cut, in high relief, on its external face, "a human bust"; and that some of these busts had very curious "curling bag-wigs." Referring to the second hall, from the south, and marked C on their plan, they say that the voussoirs which remained of the arch leading into it, showed, outside, the figures of "angels or females apparently in the air, with feet crossed and robes flying loose." Again, in an old pen-and-ink sketch made at Mosul by Sir Henry Layard, features not unlike the angels referred to are shown on the voussoirs of the archways. But the elevation preserved in the Library of the Royal Institute of British Architects shows busts or heads on the voussoirs of every archway, and is probably incorrect.

Moreover, Mr. Ainsworth, describing hall C, states that, "In the interior on both sides of the hall, were three square pilasters surmounted by full round faces, 2 feet 2 inches high by 1 foot 8 or 10 inches broad, in high relief, and executed with considerable fidelity and spirit." Ross, referring to the same, states that "In each side of this hall are three square pilasters, and on each of these, near the crown, have been three full round faces—twelve of them are still in their places, and

one, much mutilated, lying on the ground, measured 2 feet from the tip of the chin to the top of the forehead. They have much the appearance of Greek or Roman execution. . . . Many of them have a binding round the head like a double fold of rope; and a hole cut in each eyeball gives them almost the look of life. Along each side of this hall is carved in high relief a fine cornice of round balls sunk into ornamental work; these from the ground seem about the size of 12-pound cannon balls. The tops of the pilasters reach above the cornice, and



23.—PILASTER AT AL HADHR.

are crowned with sculpture similar to it." Sir Henry Layard's description of these details will be found on p. 17, *Royal Institute of British Architects' Journal*, Vol. VII., N. S., and it was to him that both Ross and Mr. Ainsworth were indebted for their drawings. Referring to hall C, he states, "The ornaments over the arch differ from those at the entrance of the small chamber; two plain stones occur between each head or bust; the cornice has but one row of acanthus leaves, beneath which runs a spiral." In

this hall, according to Sir Henry Layard, "the arch of the vault springs from the summit of these pilasters," above described. These pilasters are apparently about 10 feet wide (Ill. 33), but how much they project is not shown, nor whether they were spaced out at equal or irregular distances from each other. Curiously enough, they are carried above the main cornice of the hall and are capped by mouldings; and though Sir Henry Layard states that the vault springs from the summit of these pilasters, he makes no mention of a transverse rib which they might have carried, and without which they are devoid of meaning or purpose. I note this because M. Dieulafoy (who has not visited Al Hadhr, and has no other authorities than

we have) shows such a rib as I describe in the woodcut in his book ; and he accepts Ross's irregular spacing of the pilasters. The possibility of the palace owing its erection to Parthian, rather than to Sassanian, builders is suggested by Professor Rawlinson.\* Heads with curling bag-wigs, like those of Al Hadhr, are found on Parthian coins.

The town was besieged unsuccessfully by Trajan in A.D. 116, and it is recorded to have been then a walled town, containing a temple of the Sun celebrated for the value of its offerings. There can be little doubt but that the temple referred to is the square building at the back of the palace, for above the doorway which faces the east is a rich frieze, given in Ill. 24, decorated



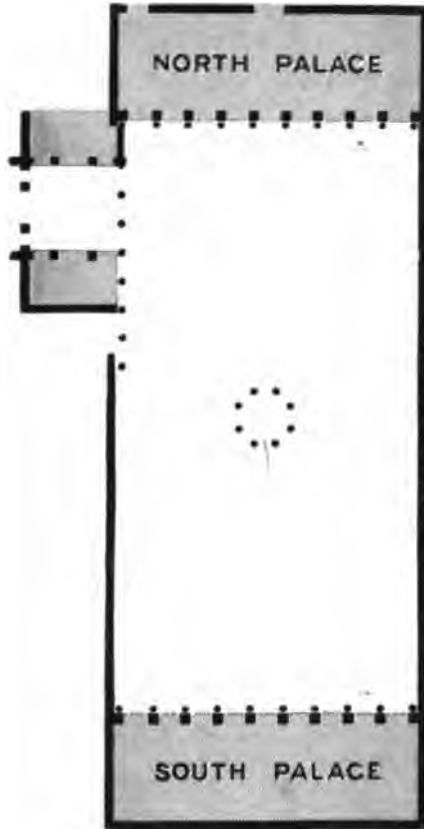
24.—PORTION OF FRIEZE IN THE PRINCIPAL BUILDING AT AL HADHR.

in the centre with the head of the Sun-God, with doves holding crescents representing the moon on each side ; and, also, among other emblems, winged griffins. In reference to this latter emblem, Mr. Loftus† states that at Warka, the ancient Erech, about 250 miles south of Al Hadhr, he found (amongst various objects, of which he gives drawings), a relief of a griffin precisely similar to the one in a frieze of the inner chamber at Al Hadhr—this being the frieze over the entrance doorway to the temple of the Sun. The ornament shown in these drawings of Mr. Loftus is of the same type as that shown in Sir Henry Layard's

\* *The Sixth Great Oriental Monarchy.* By George Rawlinson. 8vo. London, 1873. P. 372.

† *Travels and Researches in Chaldæa and Susiana, with an account of Excavations at Warka, the "Erech" of Nimrod, &c.* By William Kenneth Loftus. 8vo. London, 1857. P. 225.

drawings, viz., Syrio-Greek, which distinguishes all Eastern work of this period. Amongst these remains were found quantities of Parthian coins, so that it may be fairly assumed that the palace of Al Hadhr was built by that dynasty. As

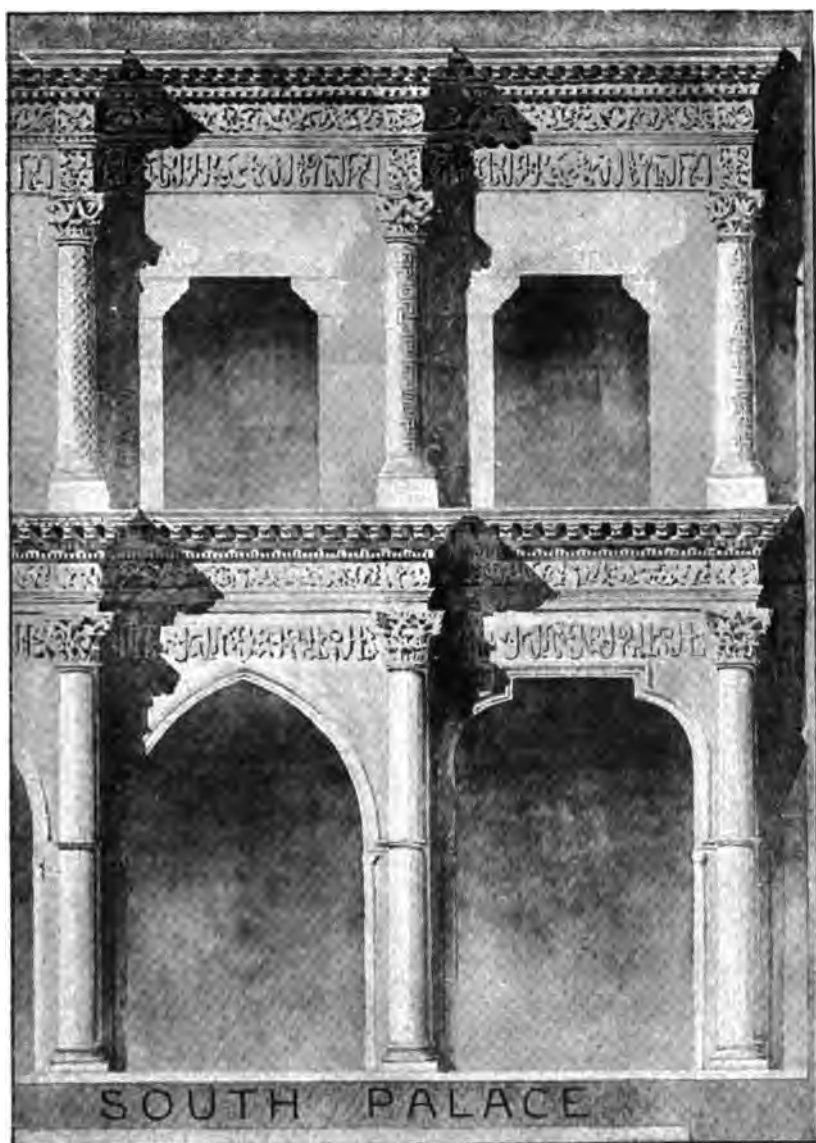


25.—SKETCH PLAN OF THE PALACE AT DIARBETR.

regards its possible date, whilst the temple already existed in 116 A.D., the palace would seem to have been added afterwards, and may be from seventy to eighty years later, or about 200 A.D. Fergusson places the date at 250 A.D., twenty-four years after the foundation of the Sassanian dynasty, to whose rulers he assigns its buildings. But, as will be seen when I come to the principal Sassanian buildings, their method of construction is so dissimilar, that it is impossible to suppose that they owe their origin to the same people.

The next building mentioned by Fergusson is the so-called palace of Tigranes, at Diarbekr, now the mosque of that town, the date of which he places at A.D. 286—

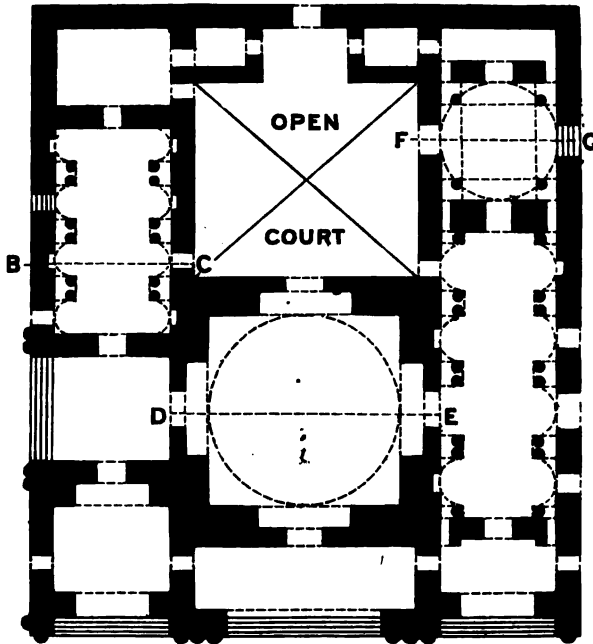
342; but, according to Professor Rawlinson, it did not come into the possession of the Sassanians until A.D. 359. The remains consist of the façades only of two palaces, the north and south facing one another at a distance of some 400 feet (Ill. 25). They seem to me to have been built up of materials taken from some more ancient palace, possibly that of Tigranes,



26.—PART OF PALACE, NOW THE GREAT MOSQUE, AT DIARBEKR.



an Armenian monarch, who, in B.C. 74, drove the Parthians temporarily out of Mesopotamia; and, though interesting for the exuberant richness of the carved shafts, capitals, and friezes, and the various peculiar forms of arched openings, they do not add much to the history of the Sassanian style. Cufic inscriptions run across the fronts, under the entablature. Here again the ornament which has been applied resembles that which

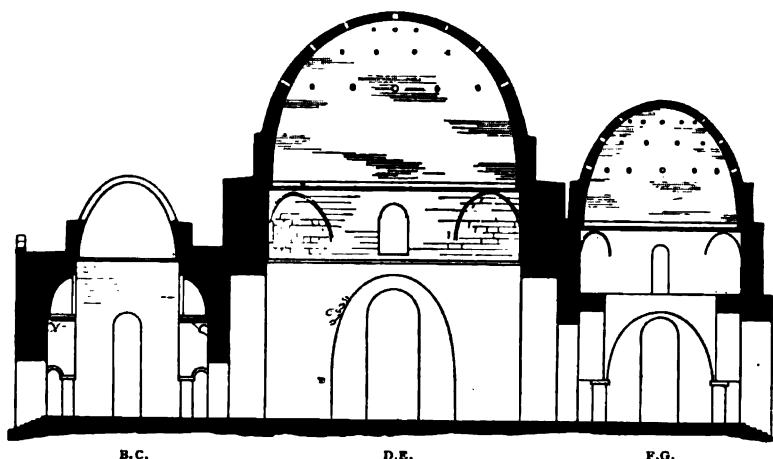


27.—PLAN OF THE PALACE OF SERBISTAN.

Mr. Loftus found at Warka, and which is peculiar to the Parthian style, shown in Ill. 26.

The next example quoted by Fergusson is the first genuine Sassanian building, and is by him ascribed to a period when the Sassanian kingdom, by its victories, and by its alliances with neighbouring monarchies, had raised the old Persian kingdom to much of its former stability and power. The palace of Serbistan is assumed by Fergusson to belong to the age of Shapoor, or Sapor, in the middle of the fourth century;

its design and construction are, doubtless, the outcome of many trials and experiments, made in buildings no longer existing or not yet discovered. The stucco decorations which were probably applied to it externally and internally have disappeared, and we are left, therefore, only with the shell. This, however, is so remarkable for the scientific knowledge displayed in its



28.—TRANSVERSE SECTION OF PALACE AT SERBISTAN.

construction, that it may be said to constitute an era in architectural style. The palace is of rectangular form, measuring about 120 feet frontage by 140 feet deep (see the plan given in Ill. 27). In the centre of the front, and again on the side elevation, are two porches, covered with elliptical barrel vaults, both leading to the centre hall, which is covered with a dome on pendentives. In the rear of this centre hall is an open court, with a recess and smaller hall at the back, and on either side of the centre hall are two great halls with recesses on each side. The halls are vaulted with elliptical barrel vaults—the traces of which still exist on an end wall—and the recesses either with circular arches or with hemispherical domes (Ill. 28). The plan and sections are given in Flandin and Coste's *Voyage en Perse*,\* but with serious discrepancies in

\* *Voyage en Perse . . . pendant les années 1840 et 1841.* Folio. Paris, 1851. Plates, Vol. I., pl. 28, 29.







29.—PENDENTIVE IN THE PALACE OF SERBISTAN.  
(From *L'Art antique de la Perse*. 4ième partie, Pl. V. 4to. Paris, 1885.)

the method of construction shown, which suggests that they were not "plotted on the spot." The section (which was reproduced in Fergusson)\* showed (1) brick rims to the elliptical arches on the lower storey, (2) walls built in stone in regular courses, and (3) a series of six and seven concentric arches thrown across the angle and forming the pendentive. Mdme. Dieulafoy's photographs, however, give another version. The wall, up to the height of 26 feet, is built of irregular blocks of stone, buried in mortar; some of these blocks are exposed on the wall surface and on the soffit of the arch, which shows that the brick or stone rim of voussoirs shown in both never existed. All this was doubtless covered over with stucco and painted, or hidden by hangings. The regular courses of masonry begin above this, and then the pendentives begin. These pendentives do not consist, however, of a series of concentric arches built one over the other, as shown in Flandin and Coste's work. The lower courses run straight through to the angle; the upper ones are brought forward, but in so irregular and unscientific a way as to suggest that for their support reliance was placed on the tenacious qualities of the mortar (see Ill. 29). That which, however, would have formed the outer ring of the pendentives is wrought on the stone down almost to the springing, so that it would appear as if the Sassanians had seen regular arched pendentives of some kind, but did not know how to build them. This is the more remarkable because, as we shall see later on, they knew how to construct semi-domes over their recesses or niches, and in regular coursed masonry (see, for instance, Ill. 29); if they had applied this to the angles, they would have invented the feature known as the squinch, a kind of pendentive employed in Romanesque work of the South of France. The dome above is built in brick, and is of elliptical section—probably the traditional method of vaulting handed down from the Assyrian period, as may be seen from a bas-relief from Nimroud in the British Museum.

It is in the halls, which are about 26 feet wide, on either side that we find the greatest advance in scientific knowledge (see Ill. 30). In order to lessen the thrust of the vault,

\* *History of Architecture*, Vol. I., p. 383, second edition, 1874.

and to avoid very thick walls, or the employment of buttresses outside, they built piers within the walls, forming a series of



30.—INTERIOR OF HALL (B.C. ON PLAN) OF THE PALACE AT SERBISTAN.

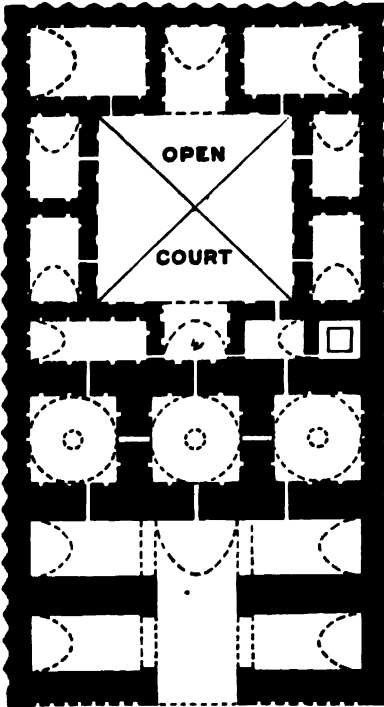
recesses or niches. These piers are not carried up to form transverse arches across the hall, but are spanned either by semi-domes, or, in two cases (where lofty doors exist to enter the main

hall), by barrel vaults; and these arches and niches come below the springing of the central elliptical vault, the width of which is thus reduced to about 17 feet. Now, it is true these spans are not great, but the principle evolved is one which we should be more inclined to refer to French twelfth-century work; and it is remarkable that the Sassanian builders should in this instance have recognised that, provided they obtained the requisite depth of wall behind the vault to resist its thrust, they might economise material or widen the halls by the use of internal piers. This, however, is not all; the lower portion of these piers is carried on columns, which give increased space: so that they had recognised the fact that, the thrust being resisted, the actual weight can be borne by supports of less superficial area than the piers themselves. Semi-domes are found at Palmyra, Baalbec, and other places in Syria, and, possibly, further east, where they form the termination of semicircular niches. Here they crown rectangular recesses, so that a second arch has to be thrown across beneath, making in the angles an extremely pretty piece of design. In fact, were the columns replaced by loftier examples, or the simple piers retained, this hall, if carried out on the scale of the great tepidarium of the Roman baths, would, by its play of line, constitute, in some respects, a more beautiful interior. It is, of course, just possible that these halls may have been built in imitation of the Roman halls, having been inspired by some Roman captive. The decoration in stucco, with which it was probably completed, is gone; but there still remains one decorative moulding, of simple form, which may be looked upon as of Sassanian origin. It is, possibly, the source of that which is recognised as Norman dog-tooth ornament, for the bricks or stones under the fascia band are set edgewise; we shall, however, come to its employment again in a later building. These halls were lighted from the vault or dome through hollow terra-cotta pots, built in the thickness of the vault at regular intervals.

We come now to a second example, the palace of Firouzabad, of which the plan is given in Ill. 31, which is looked upon as the typical building of the style, and is one in which we find a recurrence to earlier forms of Persian architecture. Fergusson assigns the date of A.D. 450 to this. The palace of Firouzabad

has a frontage of about 170 feet, and a depth of about 320. The entrance consists of a hall about 90 feet in depth, and about 45 feet wide, covered with an elliptical barrel vault. To the right and left are two other halls, also vaulted. Beyond this are three halls side by side, occupying the full width of the

building, each vaulted with a dome on pendentives, consisting of a series of concentric arches, advancing one over the other. Here the haphazard method of Serbistan is discarded for a regular and definite method of construction. It is scarcely necessary to point out that, by this system of concentric arches, the Sassanian builder did away with centering altogether, each superimposed ring being carried back on the top of such ring beneath, and resting on it. In the rear of the building is an open court, surrounded with other apartments, all vaulted with elliptical barrel vaults. That, however, which is most interesting in this palace is the stucco decoration, portions of which remain in the small niches in the front and in



31.—PLAN OF THE PALACE OF FIROUZABAD.

all the principal halls, and in the external decoration of the side and rear walls. These latter, which are illustrated by M. Dieulafoy, and which, in fact, recall the primitive method of decoration adopted by the Chaldæan builders, consist of reed-like pilasters of semicircular section with panelings between, with this important difference—that the arches which surmount them show for the first time the adoption of an arched form as a means of decoration. The cornice consists of a broad lintel or fillet, with bricks set edgewise below—the

one decorative feature characteristic of Sassanian architecture. The great doorways inside are surmounted with decorative features which, in style, are borrowed from Persian palaces, but with some important differences. First, they are in stucco only, and are planted on the surface of the work, whereas in Persian work they were always in stone; secondly, an arch replaces constructively the stone lintel; and thirdly, the cavetto cornice, instead of commencing with a vertical rise, spreads out—a clear proof of a much later and decadent form of composition. The junction in the centre also is clumsy, showing an imperfect knowledge of the features the builders were copying. The niches are imitations of the windows of a Persian palace, but are decorative only, and too shallow to serve any purpose.

M. Dieulafoy, on his visit to the country, arrived at the conclusion that this was a Persian palace, built in the style of the country in the sixth century before Christ, the real Persian palaces (as at Persepolis and Susa) being the governmental style introduced from foreign nations. It is too long to enter into the question here, but the probability lies in favour of the ancient Persian palaces at Persepolis and Susa being a reproduction on a larger scale of the still older Elamite palaces, such as were found in the ancient city of Ecbatana—not, therefore, a foreign importation, as is inferred by M. Dieulafoy, but with such foreign elements introduced in the great terraces on which the Persian palaces were built, and in the sculpture decoration, as would naturally follow when Babylonian artists were brought into Persia. Apart from this, however, the two methods of construction, the Persian and the Sassanian, are wholly and entirely different—first, the Persian architect sets great store by the careful and fine jointing of his stonework, as at Pasargadæ, where that material is employed; when he uses crude brick he covers over the surface with enamelled brick, or, as in the case of the hall of Artaxerxes at Susa, with enamelled concrete blocks, whereas Sassanian joints are of the coarsest possible description, and their construction of arches (intended to be concealed under a plaster decoration) sometimes rivals that of the modern jerry-builder, except that the mortar is

excellent. Secondly, surfaces of enamelled bricks or concrete are always found on Persian palaces; but in no Sassanian building yet discovered, including Firouzabad, has a trace of this kind of work been found except in some of the citadel walls at Susa, where it was embedded in the centre of the walls, having been taken from Persian palaces and used as a filling-in. Thirdly, the cementing medium used by the Persians was bitumen; that of the Sassanians was always lime—in fact, the latter followed very much on the lines of Roman construction, except that they occasionally used larger stones and coursed them with thicker joints; and in the interior walls of Serbistan the stones are thrown in very much like pebbles or flints in ordinary concrete, to give greater cohesion to the mass. Lastly, the introduction of an arch below the lintel of the Persian doorway is too glaring an innovation to have existed at the same period as Persian trabeated construction.

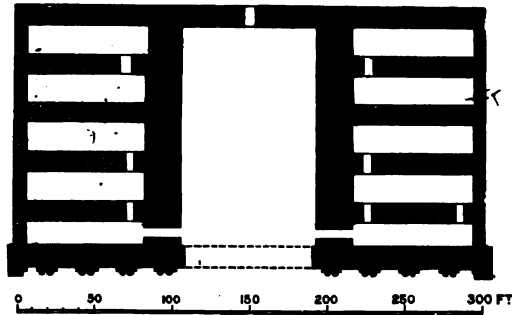
It is on account of this characteristic method of building of the Sassanians that I am the more inclined to attribute the palace of Al Hadhr to Parthian workmanship; the finely coursed masonry and thin joints there not being in accordance with the ordinary Sassanian method of building. In short, the style of this palace of Firouzabad must be looked upon, in my opinion, as being a kind of renaissance of the Persian style.

I now come to a third palace, respecting the authorship of which there is no doubt. The palace of Ctesiphon on the Tigris is known to have been built by Khosroes I., and Fergusson gives the date as about 550 A.D. If my argument in favour of Serbistan and Firouzabad being Sassanian buildings of the fourth and fifth centuries of our era has failed to convince you, a comparison of the design and construction of this great palace at Ctesiphon, and others, will enable you to judge whether, in its design and construction, it is not the natural outcome of the development of the Sassanian style such as we might find a century later—in opposition to the theory of M. Dieulafoy, who assigns them to the Achæmenidæ, the monarchs of the earlier Persian Empire, thus giving their architects the credit of being the designers and constructors



of two entirely different methods of construction, and of principles of design quite opposed one to the other.

The palace of Ctesiphon on the Tigris is better known than any other Sassanian work, owing, probably, to its proximity to Bagdad, from which town it is distant about thirty miles. It forms a rectangular block, with a front 312 feet wide, 105 to 110 feet high, and a depth of 170 feet (Ills. 32 and 33). In the centre is a magnificent portal, rising the whole height of the front, giving access to a hall 163 feet deep, vaulted with an elliptical barrel vault 83 feet wide and 95 feet to the crown of the arch. Fergusson remarks: "Instead of the plain circular arch of the earlier examples, the architect has here attempted the section of one of his domes, hoping thus to avoid some, at least, of the lateral thrust — to obtain, in short, by an ellipse what the Gothic architects managed by the pointed arch." It is difficult to understand to what earlier example (except Al



32.—PLAN OF THE PALACE OF CTESIPHON

Hadhr) he is referring, because in the palaces of Firouzabad and Serbistan, described by him, all the great vaults are elliptical. But the thrust exerted by a barrel vault is so different from that of a dome, that it is scarcely likely the idea was taken from the latter. Besides, the Sassanian architect never saw the section of his domes: they were not drawn out on paper as with us. The elliptic form, as already shown, is one of the oldest known, and was adopted, probably, for two reasons: first, because the slightly sloping lines of the lower portion of an upright elliptical curve enabled the building of the lower portion to be laid in horizontal courses; and secondly, it diminished the width of the span to be vaulted. By this method not only was an enormous centering saved by the lessening in width, but the thrust of the portion arched

with voussoirs was thus brought well within the thickness of the side walls, given in Ill. 34. The real arched construction at Ctesiphon begins about 67 feet from the ground, and the horizontal projecting courses of the lower part of the ellipse have, in fact, already diminished the width of the opening about one-sixth part of the whole—namely, from 83 feet to 70 feet.

This is not, however, the only interesting lesson we learn from this great arch. The bricks or tiles with which the arch



33.—SKETCH OF THE RUINS OF THE PALACE OF CTESIPHON.

is built are laid flatwise, a method already described as existing in the granaries at Thebes. The tenacious quality of the mortar was probably almost sufficient of itself to hold each brick in its place till the ring of the arch was complete; at all events, the centering could be of the slightest construction, with small timbers, thus saving great expense. There is also that same inclination in the rings of brickwork to which I alluded when speaking of the granaries at Thebes. It is just perceptible in the photographs. I communicated, however, with an English resident at Bagdad,\* who, in answer to my questions, states

\* Extracts from a letter written by A. B. Taylor, Esq., Bagdad, in answer to inquiries are here given (with a reproduction of the sketch he was good enough to send):—

I had no opportunity of answering with any accuracy till I could see the arch,





34.—REMAINS OF THE GREAT VAULT OF THE PALACE OF  
CTESIPHON.

(From *L'Art antique de la Perse*. 5ième partie, Pl. VI. 4to. Paris, no date.)

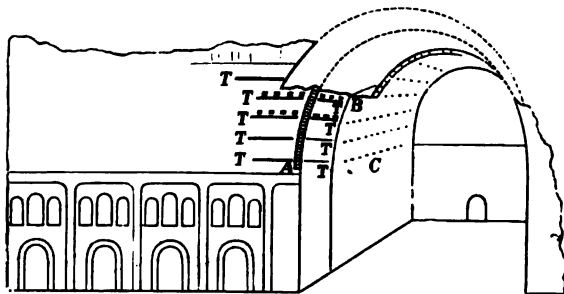


that the vertical layers of brick lean slightly backwards: M. Dieulafoy, in his section shows, I think, too great an inclination. In the vault thus constructed a series of hollow pots have been built in, going through the whole thickness of the vaults, though now blocked up; they probably served some

and ascertain by examination the various points raised by you. I enclose a rough pen-and-ink sketch (Ill. 35) of one wing of the arch, together with what remains standing of the arch itself (when the north wing of the arch fell some three years ago it did not affect the arch itself, but this last spring the whole front portion of the arch fell, leaving now only the back portion of the vault). This sketch is very rough, and probably all out of perspective, but it will give you an idea, and serve as a basis for the lettering which is explained in the enclosed memorandum. The following memorandum answers all your questions regarding the arch, and I trust will be of use to you.

Total length of arch and both wings . . . . .	312 feet.
Width of arch at base . . . . .	86 "
Height of arch to extreme top . . . . .	105 "
Length of hall . . . . .	163 "
Thickness of walls . . . . .	23½ "

The rough sketch shows the southern wing and the back part of arch, which is all that now remains standing (see Ill. 35). The ties of wood (T) extend through the thickness of the wall of the wing—no further; above them the butt ends of



35.—DIAGRAM OF THE RUINS ON CTESIPHON.

Made on the spot in 1890.

beams resting on them are visible. The pot-holes through the roof of the arch appear to be vertical, but not quite so. They run through the top of the arch, as per sketch; but, as they are all blocked up, it is difficult to be certain of the direction. There are six rows of them on each side of the vault. The whole arch is built of burnt brick and cement, and the base appears to be of the same material as the top. The crumbling away at the base is probably due to human depredations, more than to time and weather. Your supposition regarding the courses of bricks is correct. The bricks lie horizontally from A to B in the sketch, but they incline slightly to the centre as the arch overlaps. At the point B, where the vertical courses of bricks commence, there are seven layers of brick in thickness; but these decrease to four layers on the top of the arch. The vertical layers of brick lean slightly backwards. The arch is decidedly a pointed one, but the point is rounded off.

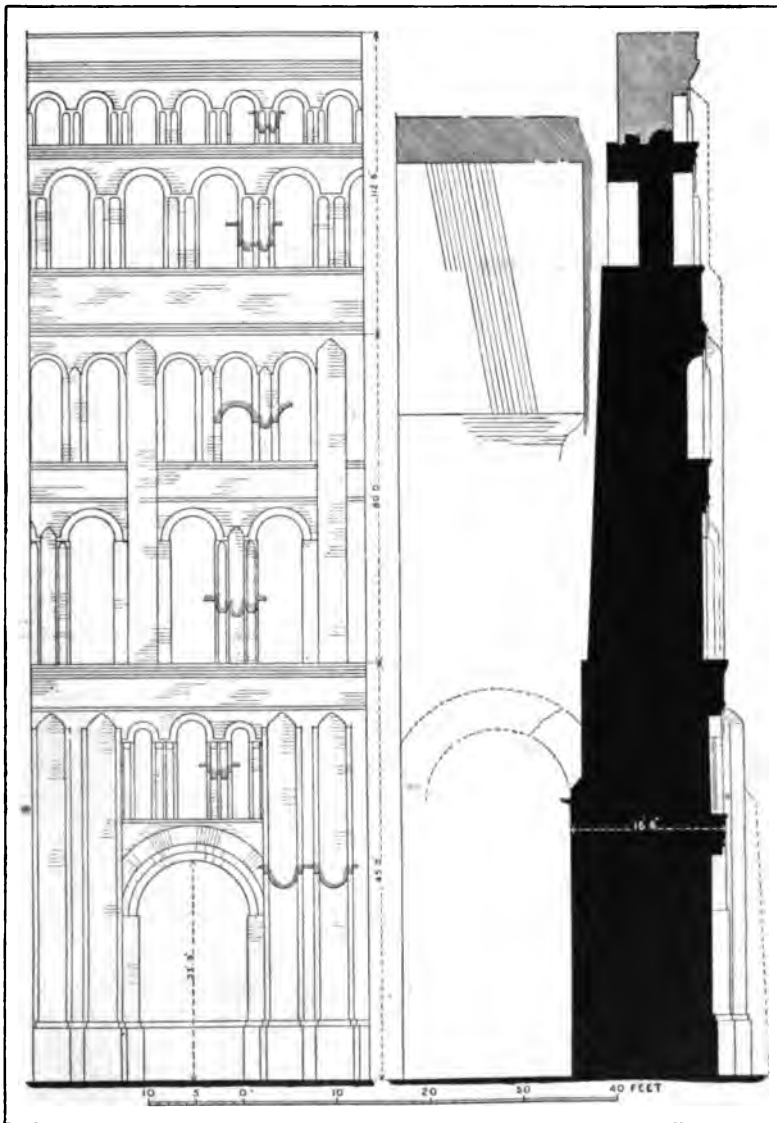
purpose, and there are various theories connected with them. M. Dieulafoy contends that they were intended to light the hall, and that the portal was closed by a curtain: which seems unnatural, for they might just as well have built a wall to keep out the weather, if it was required. At one time I thought they might have been introduced to lighten the vault, as at San Vitale, Ravenna—but they are too few in number for that purpose; or, again, that they might have served as bond between the several rings of brickwork—but this would destroy the elasticity of each ring.

The conclusion I have come to is that they were used to pass down cords for the suspension of lamps, in the same way as we find in the mosque of Sultan Hassan at Cairo; and this idea is strengthened by the assertion that when Ctesiphon was taken, in A.D. 637, a hundred silver lamps suspended from the ceiling formed part of the treasure there found.\*

In the main front, on each side of the portal, bond timber has been built in, to hold together the projecting horizontal courses. These bond timbers are carried through the thickness of wall, viz., 23 feet. In the front only are two rings of brickwork, which are carried below the horizontal courses down to the springing, or, in other words, to the level of the minor axis of the ellipse; these rings of brickwork exist only on the face, being carried back about 6 inches. It is probable that, for the formation of the front of this arch, a wall was built to serve as centering. The arch is formed of four rims of brickwork about 5 feet deep; the bricks are placed flatwise, and above a deep rim of brickwork built in the usual way. Subsequent to the building of this arch the brickwork has been carved to form a kind of foil and cusp ornamentation; it is incorrectly shown in Coste's view,† and is there represented as if each foil was constructed with brick voussoirs, whereas the ornamentation and the construction have nothing to do with

\* James Baillie Fraser, an author whose information is derived from various Oriental writers (*Mesopotamia and Assyria, from the Earliest Ages to the Present Time*, &c., p. 156, 12mo, Edinburgh, 1842), states that the great hall at Ctesiphon "is plastered and perforated with holes, from whence tradition tells that in the time of Khosroes there hung a hundred silver lamps." The same method of lighting still exists in Indian mosques, and in other Eastern buildings.

† *Notes et Souvenirs de Voyage* (1817—1877). 8vo. Paris, 1878. Vol. I., p. 380.



36.—PALACE AT CTESIPHON. RESTORATION OF ONE BAY  
WITH SECTIONS

one another. The brick rings have been carved afterwards, and might have been cut with triangular forms, or circles, or any other shape (Ill. 34).

The decoration of the flanks of this great centre portal is of the most bewildering description. It contains, it seems to me, two elements—first, that arising from the reasoning faculty, which required that the front should be strong and capable of resisting the thrust of the vaults behind and the pressure of the strong winds which occasionally sweep the plain, and which have, at last, proved too much for it—for within the last four years the whole of the right-hand wall has been blown down, and last year the front of the arch fell in; secondly, the imitative faculty, shown by the attempt, as it appears to me, to reproduce Roman features, such as are found in the various amphitheatres of the Empire—that is to say, the superimposition of columns with arcades between, shown in Ill. 36.

Now, the reasoning faculty is shown in the building of the wall, which is made thicker in the lower portion (behind which were vaulted chambers), and the employment of projecting shafts or semi-detached columns to serve as buttresses. These I have shown had already been adopted at Firouzabad; they are found also at Serbistan. These projecting shafts are delineated by Coste as being columns with capitals; but in the reproductions of Mdme. Dieulafoy's photographs I can detect no capitals—only a cone-like termination. As a matter of fact, the capitals would have had nothing to carry, for what might be considered to be an architrave consists only of decorative bands on the plane of the wall, against which the shafts rest.

On the ground storey the shaft buttresses are coupled together, which is rarely, if ever, found in Roman work (here, however, I am open to correction); the Sassanian architect coupled them to obtain greater strength. There are four compartments on each side, and between each Coste has shown an arcade of two orders—that is to say, two rings of masonry—the lower one set back behind the upper, which would be, if true, the earliest instances of their adoption. From a more careful examination of the photograph, however, I think the lower ring was faced with tiles, which have fallen out, as those of the great arch had before its fall, so that the faces of the upper and lower rings



were flush. Above the arcades is a triple arcade, here apparently of two orders. On the first storey the shafts rest on the projecting ledge of the thicker wall below; the Sassanian architect puts these shafts where he wants them most, which does not happen to be in the axis of the coupled columns below. This would have, doubtless, shocked Vitruvius, and have driven the architects of the Revival mad. Nowadays, in England, it might seem to be a natural course to take, showing a free treatment of Classic work (Ill. 36).

I should have noted that the extreme angles of the building on both sides are flanked by huge buttresses, with a set-off like a Gothic buttress, and the end compartment on the ground storey, being narrower, encloses a smaller arch, double arcade above, and, between the two, another small arched niche.

On the first storey the four compartments are equal on each side, and there is a fifth on the side of the great arch, which is not flanked with a shaft or buttress, probably for the simple reason that, there being a wall behind, it was not wanted. In the compartments of the first storey are two arches, with a small buttress shaft between and above a triple arcade. The wall on the second storey is on the same plane as the first storey, but there are no buttress shafts, there being no ledge for them to rest on. On this second storey is a range of thirteen arcades, which run independently of the arches and shafts below; and, above these, a second range, also independent of those below, with three arches to two below. Nothing remains of the cornice now but the lintel and Sassanian zigzag already described. Although built in defiance of what are now accepted as the principles of the Italian revival, the effect of the whole must have been of the most imposing character, and its existence down to the present day in a wild and unprotected country entitles the Sassanian architects to the tribute of our admiration, at least for their scientific attainments. As I have said, Ferguson attributes the erection of this palace to the age of Khosroes, about A.D. 550, the father of the Khosru, or Khosroes, II., who, in the succeeding century, subdued Palestine and destroyed the basilica of the Holy Sepulchre built by Constantine.

The remains of two other palaces have been found in Persia—one at Imumzade, which consists of a dome on arches, and a

second, called the Tag-Eiran, which is new to us, having been discovered by M. and Mdme. Dieulafoy, and published in their



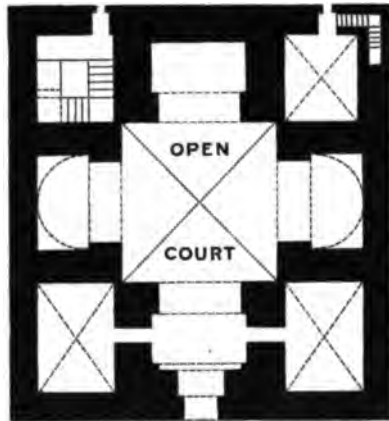
37.—PALACE OF TAG-EIRAN, PERSIA. THE GREAT HALL.

work. Tag-Eiran is probably a later example, for it shows a considerable advance in construction, and is lighted by clerestory windows between the huge barrel vaults of the hall—these barrel vaults being virtually a series of transverse arches

spanning the hall. The interspaces, however, are vaulted across in so scientific a way as to suggest a constructional knowledge nine centuries in advance of their time. I am not quite sure of M. Dieulafoy's restoration ; it is partly contradicted by one of the photographs. The plan consisted of a central hall covered by a dome, and two wings ; of the original building, one only of these rings and the springing of the transverse arches still remain, so that their real form, whether circular or elliptical, cannot be well determined. I have worked out the complete arch by projection from the photograph, and find it to be circular. I say the springing, but the lower courses are horizontal, on the same principle as in the arch at Ctesiphon. Ill. 37 is a conjectural restoration of the hall, founded on one of M. Dieulafoy's photographs.

I have now only two other Sassanian buildings to mention, and these are remarkable more for their decoration than for their construction. The palace at Mashita and the hall of Rabbath-Ammon, both in the Land of Moab, are supposed to have been erected by Khosroes II.

during the subjugation of Palestine.\* They have this peculiarity: they were built for a Sassanian monarch by Syrio-Greek artists, who decorated them with ornament derived from Hebrew monuments, interspersed with Persian animals and Sassanian detail. The pot of manna, the vine leaves, and the grapes are Hebrew symbols; the animals are Persian; and the tooth ornament, the arches,



38.—PLAN OF SASSANIAN HALL AT RABBATH-AMMON, MOAB.

\* This was the view put forward by Fergusson when the remains were first found by Canon Tristram in 1872. The more important parts of this palace have lately been transported to Berlin, and it is the more recent German opinion that the palace was built for one of the princes of the Gassanides, a South Arabian tribe of Bedouins, who ruled the trans-Jordan country in the century before Mahomet. They were in the service of the Emperors of Constantinople, and protected the country against the Persians. They were great builders and employed Greek artists.—LETHABY.



40.—DETAILS OF SASSANIAN ORNAMENT, TAK-I-BO TAN.

and the shafts without capitals, are Sassanian. All these are interpreted by a Syrio-Greek artist in his own brilliant and characteristic manner to meet the requirements of a Sassanian monarch. Ill. 39 shows a portion of the hall with its carvings.

The palace at Mashita was never terminated, and, beyond the general plan, I know little of its form, but the front of the lower portion of the enclosure wall is of unparalleled magnificence. Further details of this palace have been lately published since Canon Tristram's work on Moab,\* in the *Jahrbuch der Königlich Preussischen Sammlungen*, Berlin, 1904.

\* *The Land of Moab: Travels and Discoveries on the east side of the Dead Sea and the Jordan, &c.* 8vo. London, 1873.

The palace at Ammon, of which a plan is given in Ill. 38, consists of a central court, square and open to the sky, with four deep recesses, one on each side; two are covered with barrel vaults, the other two with hemispherical vaults on false pendentives—that is to say, the monarch wanted the feature, but the Syrian builder did not know how to build it, and he arrived at the result in a haphazard manner—somewhat in the same way as we find at Serbistan. M. Dieulafoy obtained his plan and section of Ammon from a French Consul, the section,\* however, does not agree with the photograph taken by the Palestine Exploration Fund engineers. Major Conder, in his book entitled *Heth and Moab*,† states, “The arch is of peculiar shape, being very nearly semi-



41.—TAK-I-BOSTAN.



42.—BI-SUTOUN.



43.—BI-SUTOUN.

circular, but having that same slightly elliptical form at the top which can be recognised in the arches of the Dome of the

\* *L'Art antique de la Perse*. Cinquième partie, p. 99, fig. 84.

† Palestine Exploration Fund—*Heth and Moab*. By Claude Regnier Conder. 8vo. London, 1885. P. 63.

Rock at Jerusalem." The top of the arch does not appear in the photograph, but the curve shown seems to be of the same form as the three-centred elliptical arches found in all Sassanian buildings.

With the exception of the palace of Firouzabad, the ornamental decoration of which was adapted from Persian palaces, there are only two decorative details to be found in purely Sassanian buildings: the first being the zigzag moulding under the string, and which is formed by placing the stones or bricks edgewise; the second, the peculiar treatment of angle shafts to the arched openings, without either cap or base, such as we find at Ctesiphon. Both of these are found at Rabbath-Ammon, but with an extension of the use of the zigzag ornament in its employment as a decoration of the arch. This is, in fact, a unique example of its use, and although it may be purely accidental, it is curious to note how easily it might be mistaken for the Norman dog-tooth ornament. Whilst the introduction of these two decorative features at Rabbath-Ammon suggests that Khosroes brought over some of the artisans with him, both here and in Mashita he was evidently indebted to the Syrio-Greek artist for that elaborate wall-surface carving which is the chief characteristic of these two buildings. Except for the false pendentive, I should be inclined to think that the building at Rabbath-Ammon was designed by, and its execution carried out under, a Sassanian architect, with a few Sassanian masons; and that the work was handed over to Syrio-Greek artists to decorate. The way in which the ornament runs across the horizontal and vertical joints of the masonry shows, first, that it was carved after its erection; and, secondly, that, as is usual among Eastern nations, the artist set out his work on the wall as he went along. Very much the same method is adopted by Indian artists at the present day, who do not require drawings of ornamental detail to work from, and by the Egyptian potter when covering with ornament those pots and vases at Siout and Assouan which are probably well known to you.

The continual reproduction of the vine, with its leaves and bunches of grapes, shows that the artist had been previously employed in the decoration of Hebrew or Jewish buildings;



39.—DETAIL OF ANGLE OF COURT, RABBATH-AMMON, MOAB.





and the type of ornament adopted elsewhere suggests that it is based on Greek scrolls and foliage, which, from the first century before Christ onwards—in the tombs of the Kings and Prophets at Jerusalem, and in the buildings of Central Syria—we may assume to be the work of colonies of Greek artists who migrated into Syria to escape the domination of the Romans in their own country. Later on, the descendants of these same artists became the early disciples of the school which, in the time of Justinian, produced those magnificent works in Constantinople, Thessalonica, Jerusalem, Damascus, and other Eastern cities.

How far the Sassanian architect, with his domes and pendentives, led to the Greek development of these features in the Byzantine style, it is difficult to say. There is no doubt in my mind that he derived them from the earlier buildings of Mesopotamia, and, therefore, possibly their retrospective value is of more importance than their prospective value. This theory, however, would lead me into a controversial inquiry, into which it would be premature to enter.

I have confined my attention to the purely architectural side of the question. It must not, however, be supposed that there are not works of the Sassanian dynasty in which sculpture forms the chief subject of interest. There is, I believe, only one instance of Sassanian sculpture in the round—a figure of Sapor I. carved in stone. Of bas-reliefs cut in the rock there are a considerable number, the style and execution of which show that the Sassanian sculptor followed on the lines of the Persian, who, in his turn, carried on the tradition of the Babylonian artist. The figures have not the vigour of the latter, or the refinement of the former, but in the ornamental details they carry on the development of certain features, so that in one case—for instance, the Tree of Life, such as we see represented in the earliest Chaldæan sculptures—the ornamentation passes through successive phases, until we recognise, I think, its influence in the pot of manna and vine of the Hebrews, and, later on, in the numerous sculptures in Venice brought over from the various towns of Syria, and notably on the exterior of the apse of the church at Murano (Ill. 67) (parts of the decorative features of which are supposed to be of Syrian

extraction). I may here note that the cornice of this same church possesses the Sassanian zigzag as already described, carried also round the hood mould of the arch: this may, however, be purely accidental.

Flandin and Coste give several representations of Sassanian capitals,\* but what position they occupied, and to what monuments they belonged is not said. There is one example, however, which comes from Tak-i-Bostan (Ill. 41)—a recess with a semicircular barrel vault; in this case, a bas-relief at the back is framed between two pilasters with capitals. The rock having been cut away, to allow of the relief of the figures, a cove has been left above them, and the capitals actually follow the curve—a unique example of their treatment in this way—suggesting that the Sassanian architect did not understand columnar architecture at all, but looked upon a capital only as a decorative termination of a projecting shaft.† There is a peculiar resemblance between the foliage of this cap and that of the mosque of Sta. Sophia, both belonging to about the same period.

In conclusion, I may add that one of the results of my researches has been to throw considerable doubt on the correctness of all illustrations unless they are supported by the clearer evidence of photographs or photogravures. It is for you to judge by examination of reproductions of Mme. Dieulafoy's photographs how far my strictures on Coste's work are correct. Curiously enough, M. Dieulafoy in his own restorations is not always to be relied on, even with the photographs before him, and I should perhaps here note that I have confined my attention to the two last volumes of his work, dealing with what I consider to be Sassanian work. I have thought better to defer any consideration of his reproductions of the ancient Persian palace until he has given us some more definite information respecting his discoveries at Susa.

\* *Voyage en Perse . . . pendant les années 1840 et 1841.* Folio. Paris, 1851. Plates, Vol. I., 6, 17, 17 bis.

† *Ibid.* Plates, Vol. I., 2, 3, 4, 6. Referring in the volume of Texte to Tak-i-Bostan, Flandin states that the sculpture possesses a distinctive character in its "grandes masses simples, dépourvues de modelé ou de travail, opposées à des parties toutes chargées de détail, qui . . . semblent avoir été systématiquement étudiées avec un soin minutieux, et qui se font d'ailleurs toujours remarquer par la pureté et l'adresse avec lesquelles elles sont exécutées."

# REVIEW OF M. DIEULAFOY'S WORK ON THE EXPLORATIONS AT SUSA, 1893.

COMMUNICATED TO THE JOURNAL OF THE ROYAL  
INSTITUTE OF BRITISH ARCHITECTS OF 20TH APRIL,  
1893, FROM WHICH IT HAS BEEN REPRINTED  
BY PERMISSION.

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## SUMMARY.

GENERAL REFERENCES TO THE CONTENTS OF THE WORK—AND OF THAT PORTION DEVOTED TO THE FORTIFICATIONS—THE DISCOVERY OF THE FRIEZE OF THE ARCHERS AND THAT OF THE LIONS—M. DIEULAFOY'S RESTORATION OF THE GREAT STAIRCASE—TERRACE—PYLONS—COURT—THE APADANA OR HALL OF COLUMNS AS THE PORTICOES OF THE PALACE AND ITS RESTORATION BY M. DIEULAFOY—COMPARISON WITH THE PORTICO OF THE PALACE OF DARIUS AT PERSEPOLIS AND CONJECTURAL RESTORATION OF THE SAME BY COSTE AND THE AUTHOR—REFERENCES TO THE PLANS OF OTHER BUILDINGS AT PERSEPOLIS OF SIMILAR PLAN TO THE PALACE AT SUSA.



## DIEULAFOY'S WORK AT SUSA.

M. DIEULAFOY'S long-expected work, containing the results of his explorations at Susa, has just appeared. It was published originally in parts, of which the first, containing (in three chapters) an account of the geography, historical and political, and the history of Susa, from its archaic period down to the Mahometan invasion, was published in the early part of 1890. The second, containing an account of the fortifications, their principles, parallels found in Egypt, Assyria, &c., appeared in December of the same year. A year and a half passed before the third part was issued, in which the faïence and enamelled béton, including the famous lion frieze, were treated; and the fourth part, containing the restoration of the great palace of Artaxerxes Mnemon, and other remains, appeared towards the close of last year. The whole volume, with some additional plates, comes out now in a complete form, and has been presented by the author to the Royal Institute of British Architects' Library. When one takes into account the enormous magnitude of the researches which M. Dieulafoy has conceived it necessary to undertake, and the extreme beauty and elaboration of the plates, one can well understand the length of time it has taken to realise this publication.

The most valuable portion of the whole work, from an architectural point of view, is that which has been devoted to the fortifications—a subject in which M. Dieulafoy, as an engineer, may be looked upon as *facile princeps*. The researches he undertook and the discoveries he made there seem to have been much more careful and more complete than those of the palace, and he carries you with him, therefore, in his arguments when, in subsequent chapters, he enters on the restoration of the original walls. It could scarcely be expected that in the comparatively short time he spent in Susa he would have been

able to trace out and measure the stupendous lines of defence which encompass the three eminences of the tumulus—namely, the Citadel, with its Keep; the Royal Acropolis, containing the palaces of the king and the residences of his retainers; and the Apadana, or throne-room. But, having once correctly ascertained the exact formation of the triple wall of circumvallation in those points where they were best preserved, it became easy to trace the main lines on which they existed throughout the whole perimeter. What seems to be the most astonishing is the extraordinary massiveness of the outer walls, which in some instances measure 60 feet thick; and these only constituted the outer line, the whole depth of defence, including the triple wall and interior rampart, measuring no less than 400 feet. It is necessary here to take into account the fact that the walls were built with bricks dried only by the sun; but a few weeks' exposure in a temperature of 150 degrees to 160 degrees Fahr. would yield a material of considerable durability. In some cases the outer skins of these walls, from 15 to 20 feet in thickness, were built first with sun-dried bricks, the centre portion being filled with clay (*pisé*). Provision for draining these walls was made with layers (horizontal and vertical) of pebbles or gravel (*gravier*). The proximity of the towers is also another interesting feature, this proximity being necessitated by the comparatively small range of the arrows, so that the curtain walls were only 80 feet long, the distance from centre to centre of tower being 115 feet. The height of the walls surrounding the palace of reception, or throne-room, was of less dimensions, so that from its platform an extensive view could be enjoyed by the king and his retinue.

A special value is imparted to this section of the book by the elaborate description M. Dieulafoy gives of the methods of attack and defence adopted in ancient times, illustrated by numerous woodcuts taken from Sir Henry Layard's *Monuments*, one of which, on p. 141, actually represents this Acropolis of Susa. This portion of the work is based on the interesting contributions which Viollet-le-Duc made to the methods adopted by the Romans; but here M. Dieulafoy carries it further back, and not only proves the correctness of many of Viollet-le-Duc's theories, but adds considerably to

them. By way of parallel, M. Dieulafoy describes the fortresses of Egypt and Assyria, the former derived from M. Maspero's works, and the latter from those of Sir Henry Layard, Victor Place, and other authorities. This portion of the work is also abundantly illustrated with woodcuts from their plates.

Chapters IX. and X. deal with the *faïence*, or enamelled terra-cotta, and the enamelled *béton* (*terre émaillée*), which seems to have been employed in the palace of Artaxerxes Mnemon. It is no exaggeration to say that the frieze of lions, the frieze of archers, and the wall linings of the ramps of the great stair-cases, form by far the most beautiful scheme of wall-decoration which has ever been conceived; and the reproductions in M. Dieulafoy's work, which are of an admirable kind, fully bear out this assumption.

The frieze of lions was found, as is well known, with its face downwards, lying on the pavement of the great court in front of the Apadana, or throne-room, and was covered over with 9 or 10 feet of the earth-wall, which had fallen on it. M. Dieulafoy happened to be running a trench at an angle in front of this wall when one day a workman brought some enamelled *béton* blocks to him. Recognising that they might form part of a frieze, he ran another trench parallel with the wall, and as the fragments were taken out they were placed side by side, face upwards, until one complete lion, portions of others, and an inscription rewarded his discovery. This is now set up in the Louvre, and constitutes one of its greatest treasures. The *béton* blocks would seem to have had the outlines drawn on them whilst still in a soft state, slight furrows being left to keep the enamel in its place. The blocks were afterwards burnt, and although here and there the enamel has slightly run, this has only taken away what might have been too hard an outline. Seen from a distance the effect is most decorative, and the beauty and harmony of the colours are perfect. The frieze of archers was found at a much lower level in the proximity of the south-east corner of the Apadana; and M. Dieulafoy is of opinion that it is of far earlier date than Artaxerxes Mnemon, and belonged probably to the palace of Darius. Though found at a much lower depth, and belonging to an earlier palace, M. Dieulafoy utilises it as a decoration to the

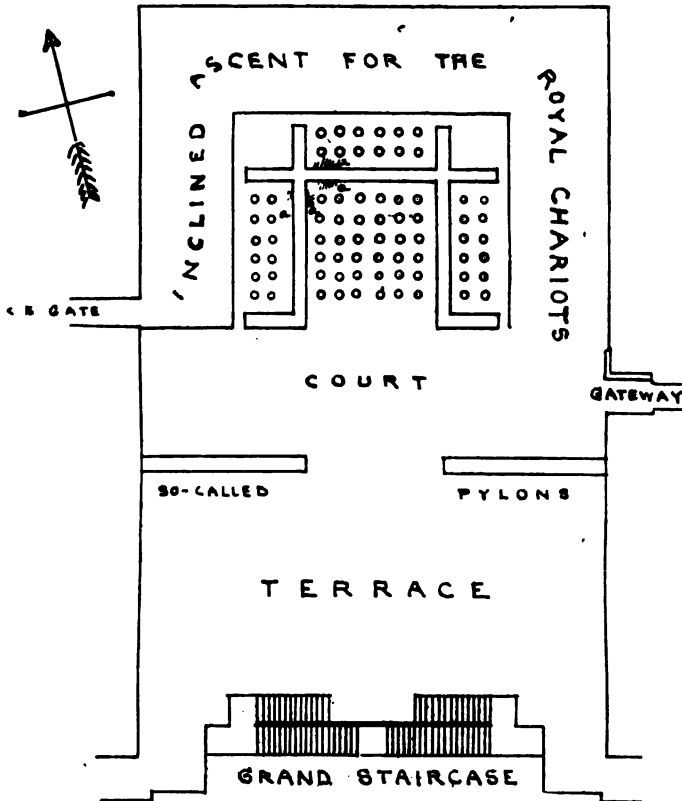
wall in his restoration of Artaxerxes' Palace, which scarcely seems reasonable. The only use a Persian monarch made of his predecessor's palace was to employ the materials as a *filling-in* to his own walls.

The wall-lining of the great staircase was not found *in situ*; in fact, no trace of the latter remained; and so many patterns of staircase wall-lining were discovered that I can only suppose there were several staircases, the position of one only of which M. Dieulafoy considers he has found. When we come to the discoveries made in the Apadana,\* I must confess to a certain amount of disappointment at the very moderate addition M. Dieulafoy contributes to our knowledge on the precise plan of this structure. Already in 1850 Loftus had discovered and measured the Apadana, which he showed had a central hall of thirty-six columns and three porticoes, precisely the same as the palace of Xerxes, except that it was of slightly smaller dimensions; and common sense would lead us to suppose, in opposition to the theories of Coste, Texier, and MM. Perrot and Chipiez, that Fergusson's restoration, with walls round the central hall and flanking the porticoes existing, was correct. Absolutely the only addition M. Dieulafoy makes now to our knowledge is the fact that at the north and west angles of the hall he discovered the position of the wall, which he traces, by the discontinuance of the pavement (Ill. 44), the thickness of the wall being 16 feet. This is a very poor contribution; in fact, it seems that the extraordinary value of the artistic treasures which day by day he was unearthing on the site caused him to forget that he might one day be called upon to work out a restoration of the Apadana itself. Loftus had also discovered the remains of capitals and bases, which would have enabled us, by comparison with the palace at Persepolis, to restore walls and porticoes as M. Dieulafoy has done.

\* This is the term given to the central hall of columns of a Persian palace, and is so recorded in an inscription found at Ecbatana. M. Dieulafoy contends that it is not mentioned in any building at Persepolis, and applies only to the example at Susa, because on one of its faces (the south) there was no enclosure wall to the hall of columns. As M. Dieulafoy, however, in his work, *L'Art antique de la Perse*, gives that name to the hall of Xerxes, which certainly had four enclosure walls, and moreover, on Plate XXI., Vol. II., describes a column as coming from the Apadana of Xerxes, he must have changed his mind.



In order to show the relative position of its three sub-divisions, the Acropolis of Susa consists of a plateau in the shape of a rhomboid, measuring, approximately, 3,000 feet long from east to west, and 2,800 feet from north to south. A spur at the



44.—PLAN OF THE APADANA, OR THRONE ROOM, IN THE ACROPOLIS OF SUSA.

*a a*, Traces of pavement showing line and thickness of walls.

south-east angle makes the east side about 3,600 feet long. This side, occupying nearly half the plateau, and called the Royal Acropolis, contained the palaces of the king, his harem, and the residences of his retinue. On the south-west angle the citadel, with a semicircular front facing south-west, occupied half of the west side, and the Apadana, with its court and

terrace, the other half. These two latter overlooked the valley through which the Chaour River ran. Between the three was a triangular space, which M. Dieulafoy calls the "Place d'Armes." From this was the principal approach to the Apadana. Two others existed: one on the north side, with an ascent for chariots to a road round the Apadana; and on the south side a communication with the Royal Acropolis through a stone gateway, portions of which were found. No trace of the great staircase leading to the Apadana platform from the "Place d'Armes" could be discovered; but the marked difference in level between the two, and traces of an enclosure-wall on the north side, enabled M. Dieulafoy to approximate its position (see Ill. 44). In other parts of the excavations—chiefly, I believe, in the walls built by the Sassanians at a later period—M. Dieulafoy discovered the enamelled béton slabs which face the walls of this staircase, and by piecing them together he was able to determine pretty accurately the rise (4 inches) and tread (15 inches) of the steps, and by the difference in level, the total ascent. The length of the steps and the size of the landing failed him; here, however, he was able to base his restoration on the great staircase of Persepolis. It (see Ill. 44) consisted of a double flight running right and left, with return flights, and he has shown 36 steps, which give a total rise of about 8 feet. In front of the staircase, and at about 300 feet distant, M. Dieulafoy traced the remains of two immense walls, about 23 feet thick and 230 feet long each, and these, by a curious misnomer, as it seems to me, he calls pylons. He compares them with the pylons of Egypt, which, as we know, were immense doorways in stone, with pyramidal masses on each side, sometimes of stone and sometimes of brick, the actual doorway ranging from 10 to 25 feet wide, and proportionally double the height. He also quotes, as a similar feature the Vicadahya at Persepolis. (This, according to Fergusson, was a square hall, with its roof supported by four columns, and with centre doorways on each face; two of these still remain; the trace of the third is shown in Coste's work; this, however, does not prevent all the French archæologists from supposing it to be open on the two sides.) The principal doorway in this Vicadahya is 12 feet wide, with the same proportion as regards

height as those in Egypt. But what are we to think of M. Dieulafoy's appellation to the feature of Susa when we find that the distance between the two walls—the opening, that is to say—measures *over 180 feet*? It seems to be rather a stretch of the imagination to call this a doorway, and it is unfortunate he did not search between the two walls for some further indications of an enclosure. It was from the inner surface of one of the walls that the lion frieze, as before mentioned, was obtained. Beyond these walls, and about 170 feet distant, stood the Apadana, which, with its porticoes, measured about 400 feet wide by 250 feet deep. A plan of this palace is given in his general plan of site, which, with the smaller pylons and the staircase, is reproduced in Ill. 44. In this it will be seen that he encloses the ends of his porticoes with flank walls, but he omits the wall on the south side of the great hall. Such, he admits, was not his first thought, and he suggests that on his return to France, after his first visit to Susa, he assumed that the enclosure consisted of four walls similar to the Persepolitan examples. But while he was occupied with the restoration four facts struck him: Firstly, that the principal entrances to the Persepolitan examples are through a portico, whereas there is none here on the south side, which the staircase shows to have been the chief entrance; secondly, the continuation of the pavement in front of the throne-room (mentioned for the first time, but not shown where on plan), which, running through, proved there could be no wall there; thirdly, the orientation (south) of this façade; and fourthly, the designation of the Susa Hall by the Persian word Apadana, which does not exist at Persepolis. As regards the latter fact, I have already pointed out that he himself used the word Apadana in connection with the hall of Xerxes in that city; and as regards the second fact, in 1888, when he published his work on *L'Art antique de la Perse*, he showed a plan of the Apadana at Susa with four walls. His last visit to Susa was made in 1886, two years before he published this plan. But the singular fact is that, even in his complete work just issued, M. Dieulafoy gives two versions—one published, I think, in the early part of 1892, the large general plan from which I borrow my illustration; and an outline plan published in or about November (p. 342), in which he shows antæ in the great hall

which are not suggested in the former. But I will return to these features again.

To the second and fourth facts I do not attach much importance, any more than M. Dieulafoy was inclined to do himself; but with respect to the first and third, I think there is considerable reason for his restoration. Placed as it is in face of the great wall and staircase, there is every probability that in this example the central hall served the purposes of the portico. It faced the south, and the throne placed below the second and third rows of columns is not likely to have received the rays of the vertical sun. M. Dieulafoy's argument, however, is chiefly based on the existence of similar portions in other palaces, built, as I think, by the Parthians and Sassanians at a much later date, viz., at Al Hadhr, Ctesiphon, and Mashita, and the much later Persian palaces. The precise epoch at which these were built is not of importance; they were erected in a similar climate, and may well, therefore, be taken as argument. The great halls of Al Hadhr, by the way, face east. Mashita and, probably, Ctesiphon have south aspects.

M. Dieulafoy's restorations of the Apadana are shown in two photogravures taken from the model which he has had prepared and which is now in the Louvre. In the photogravure of the south front he has failed to take cognisance of the deep trench on the left-hand side, the trench which forms the inclined ascent for the chariots, and which at this point is 9 feet deep; some sort of wall should have been shown there. But in the other photogravure, taken from the north-west corner, the discrepancy is worse, for there also the podium wall is 9 feet high; and if this had been worked out in the model, I think M. Dieulafoy would have thought it more reasonable to have placed some kind of structure in the angle formed by the two flank walls of the north and east portions. He may have elected to stand by the example of the palace of Xerxes at Persepolis, where these angles are supposed not to have been occupied by buildings; but Mr. Weld Blundell\* discovered there in 1892 a

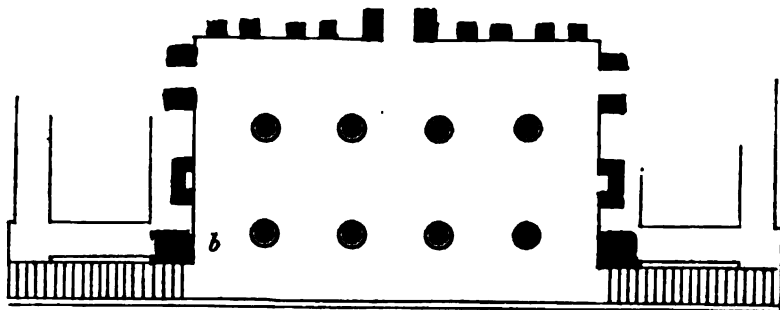
\* Mr. Weld Blundell went out to Persepolis in the beginning of 1892 to select examples of the best sculptures (capitals and bas-reliefs) and superintend the execution of moulds, in order to reproduce casts for the British Museum. I prepared for him a plan of Persepolis and directed his attention to three points:—1. The exact position of the drain which was shown in Coste's plan as

deep layer of burnt wood similar to that which was found in the Palace of the Hundred Columns, and which proved conclusively that these spaces were occupied and covered with a wooden roof.

Now, as regards the antæ shown in M. Dieulafoy's last plan, p. 342, but not shown in any of his earlier plans, though he does not specifically draw attention to them, in a valuable plan of the hall of Xerxes, Persepolis, given on p. 338, he shows antæ round the great hall; this is published to confute MM. Perrot and Chipiez's imaginary restoration with three porticoes into a central hall *with no enclosure walls at all*, as if such a structure could possibly exist; and, if erected, could ever have served the purposes it was destined for. In this plan, but in a hesitating manner, as if not quite sure, M. Dieulafoy indicates the trace of two antæ. It should be noted that here, as at Susa, M. Dieulafoy has not the courage to show them in the porticoes, where I presume they would equally be required to carry the beams of the roof. Is there, however, any precedent for antæ in Persian work? I am aware that in Greek work the antæ are, like the triglyphs and other features, due to the traditional use of a feature, decoratively, which was in early work a constructive necessity. The drawings published in Schliemann's work on Tiryns, and the minute description given by Dr. Dörpfeld, clearly show that the early Greek architects, in the feature known as "portico-in-antis," were unwilling to trust to the support of a crude brick wall, or one built with rubble masonry set in clay mortar, to carry the architrave of the

running under where Fergusson places the enclosure walls of the Great Hall of Xerxes. 2. The trace of walls enclosing the angles of the flank walls of the porticoes already referred to; and 3. The truth of the statement by Coste and Texier that no walls could exist on certain parts of the site, because they said the natural rock exists there, and no traces of walls could be found on them. Mr. Weld Blundell ascertained—1. That the main drain ran underneath the hall, between the enclosure walls and the first row of columns, and that some of the natural rain-water ducts, measuring 15 inches by 12 inches, and cut in large blocks of stone, actually existed 15 inches and 14 inches above the level of the platform, showing that they could not have served only to drain the latter, as Coste, Texier, and MM. Perrot and Chipiez imagined. 2. That the angles were occupied, as evidenced by the layer of charcoal; and 3. That what Coste thought was the natural rock turned out to be an artificial crust caused by the continual passing of rain-water containing lime washed over the surface, and hardened for centuries by a tropical sun. When broken with some labour with the pickaxe the traces of foundations of walls were found beneath the artificial crust.

portico, and therefore they erected against the flanks of the side walls barks of timber. These no longer exist at Tiryns, but their stone bases were found, with the sockets in which the traces of the lower end of the vertical beams were fixed, and these features, the *antæ*, were copied afterwards in marble as a decorative finish in the Greek temples. No example has yet been found in Egypt in wood, but *antæ* are found in the "portico-in-antis" and interiors of the tombs at Beni Hassan, which leave no doubt as to their origin. But is there any reason for supposing that the same system was adopted in Persia? I think not. I am of opinion that they provided



45.—PLAN OF PORTICO, PALACE OF DARIUS, PERSEPOLIS.

against this contingency in the same way which is adopted by us at the present day—namely, the use of wall-plates. It is true there is only one example existing which suggests it. In the stone pier of the portico of the palace of Cyrus (published in M. Dieulafoy's *L'Art antique de la Perse*) at Pasargadæ, in addition to the sinking in which the architrave of the portico was fixed—and I will refer to this feature again—there is a second sinking or mortise in which the plate was laid to carry the beams of the porch. I think, therefore, that the probabilities are against the employment of *antæ* in Persian architecture,\* with the sole exception of the main piers which always flank

\* M. Dieulafoy, however, himself disposes of the *antæ* in his own drawing, represented in Ill. 44, p. 95, in which he indicates the exact line of wall, which he traced on the existing pavement, shown by hatching *a a*, which he contends absolutely decides it; and no *antæ* are shown, though the pavement passes by where two would have existed.

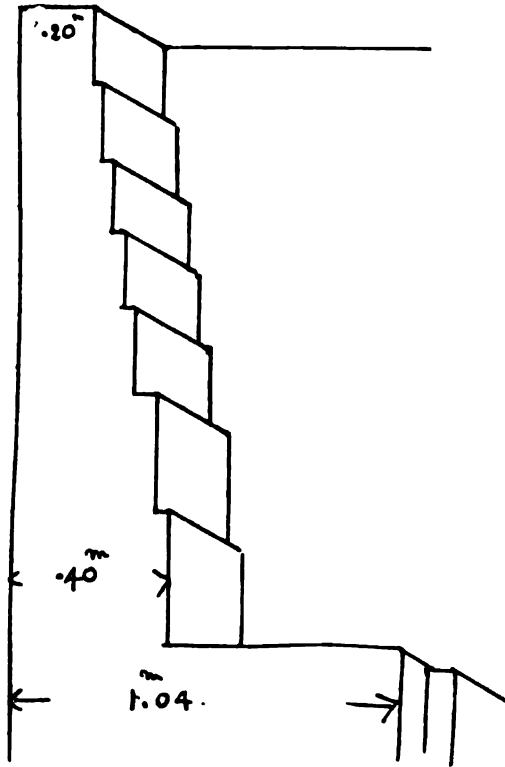
these porticoes, but for which there was a special requirement. To explain this I will point out what seems to be another mistake in M. Dieulafoy's restoration. It will be observed in the photogravure of the south front that the piece of timber, placed in the backs of the bulls which carry the architrave, is shown flush with the front row of columns.

Now, it is a singular thing that not one of the restorers of these Persian palaces seems to have grasped the fact that the Persian capital was not only a double-bracketed capital, but a quadruple one, by reason of the wood bracket placed on the back of the bulls. Whilst the projecting bull-heads lessened the bearing of the architrave beams, parallel to the façades of their porticoes, *the wood brackets performed a similar task with the cross beams*, and it is really amusing to trace the various ways in which Coste, Texier, MM. Perrot and Chipiez, and M. Dieulafoy twist and turn about in their restoration to get rid of the dilemma. Sometimes they destroy any value they might have, by keeping the front of the wood brackets on the same face as the columns (M. Dieulafoy, MM. Perrot and Chipiez, *Hall of Xerxes*). Sometimes they actually allow it to project without doing any duty (Texier). M. Dieulafoy, in his work *L'Art antique de la Perse*, carries the bracket through to the back wall or range of columns, as if it were a tie; a function it would certainly be incapable of fulfilling, as it has no hold on the front column. Coste, however, carries the absurdity still further. In order to explain the question at issue, we have in the palace of Darius at Persepolis the best preserved structure on the platform there, and it is on this palace that Fergusson based his restorations. There is only one portico, but that will be sufficient for my purpose. I give a plan in Ill. 45, from which it will be seen that it consists of eight columns, placed in two rows, with four in each, and flanking walls. The columns are gone, but their position is shown by the foundations, and they were copied in the tomb of Darius carved in the rock which overlooks the platform. On each side of the first row of columns is a stone pier, in the side of which is still preserved the sinking in which the wooden architrave and cornice of the portico rested. This

is clearly shown in Coste's work on *L'Ancienne Perse*, Vol. III., pl. 118, which is also reproduced in Ill. 46. The pier has a return of about 3 feet 5 inches, and in the upper part is cut a sinking which has various set-offs. In these fitted the architrave and upper members, which formed an assemblage of

several timber beams.

Their form and function are recognised in the tomb of Darius, of which I give a section and part of one column in Ill. 47. Now it will be observed that the architrave of this tomb which is cut in the rock *actually projects 23 inches in front of the face of the column*. What was the object of so peculiar an arrangement? I can only conceive of one reason. If, as I am of opinion, the capital with its wooden bracket was a *quadruple-bracketed capital*, it is evident that while the bull-heads lessened the bearing of the architrave in one direction, and the

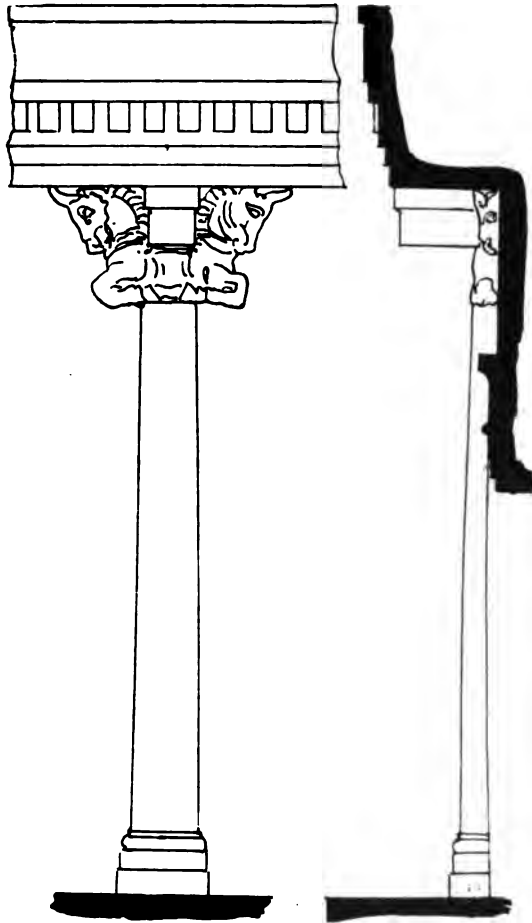


46.—UPPER PORTION OF STONE PIER b.  
(See Ill. 45.)

wooden brackets the cross beams at right angles to the same *in order to counterbalance the weight on the inside, it was necessary to carry the architrave out to the end of the bracket on the outside*, and this is one of the reasons why in every portico a stone pier was necessary at each end to keep this



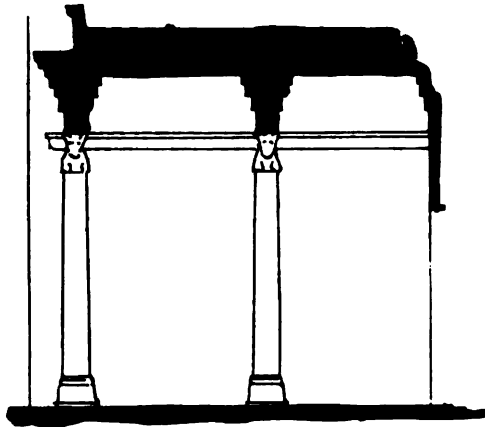
projection in position. Now applying this structure in the tomb to the disposition of plan shown in Ill. 45 in the palace, it will be seen that the line of columns is set back to allow of this projection in front. With these facts before Coste, and with his own plate, No. 118, before him, it will scarcely be conceived that in his imaginary restoration he should actually have set back the face of the architrave, as shown in Ill. 48, so as to bring it back 30 inches instead of the 16 inches as shown on plate 118, and allowed the bracket to project forward uselessly 14 inches. My own version is shown in Ill. 49. Now it is only fair to M. Dieulafoy to say that in the palace of Susa no trace of any such stone piers has been found; but all these



47.—TOMB OF DARIUS. ELEVATION AND SECTION.

palaces reproduce one another in their features with such absolute fidelity that it is almost certain that the same rule which applied to the palace of Darius, to his tomb, and to three other tombs in the same rock, obtained in the palace of Susa. With

respect to the vertical grooves which M. Dieulafoy introduces on the exterior walls, there is no authority for them in Persian work, and his design would gain infinitely if they were omitted, and the wall surface decorated with that diaper of white and pale rose tints which was discovered to have existed under the frieze of lions. These grooves are still more out of place, as they are shown descending on the top of the doorways, which also seem uncalled for: such doorways and niches only existed under the portico or in the hall, and, so far as we know, are not found in external walls.

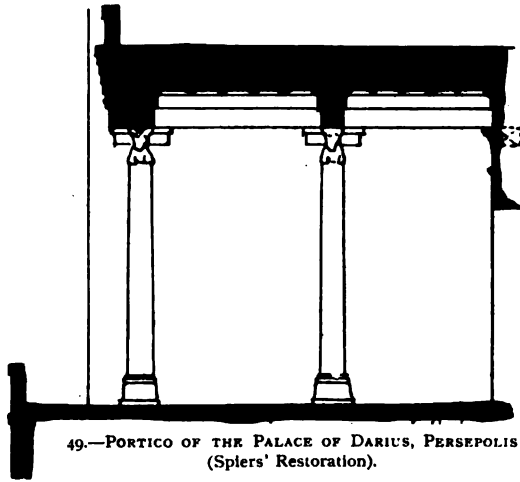


48.—PORTICO OF THE PALACE OF DARIUS, PERSEPOLIS  
(Coste's Restoration).

MM. Perrot and Chipiez take exception to the effect of the wings, which, projecting in front of the first line of columns in the Apadana, look, they say, like towers. As I hold the opinion that in the palaces of Darius and Xerxes at Persepolis the porticoes were flanked by towers on their principal fronts, I

am not inclined to find fault with their effect, but architecturally speaking, the setting back of the first line of columns as shown cannot be defended. The crowning features of the walls and their decoration seem to be the best portion of the restoration; but I am quite unable to understand the minute calculation into which M. Dieulafoy has found it necessary to enter (pp. 280—286) in order to fit into his design, as a sort of Panathenaic frieze under the porticoes, the so-called frieze of archers. If I understand rightly (p. 280), the archers were found at a great depth—namely, 13 feet below the standard level of the Apadana, and under the substructures of the great doorway which communicated with the Royal Acropolis. It is quite certain, therefore, that they could not have decorated

Artaxerxes Mnemon's Palace. Moreover, in their workmanship M. Dieulafoy recognises an earlier and a purer style, which he considers belongs to the time of Darius, who is known to have erected a palace here. It is true that a similar frieze might have adorned the Apadana in question, but no traces of its remains have been found, and even then it is not likely to have been of the same size: for if there is any characteristic of these Asiatic sovereigns which is predominant in their nature, it is the desire to excel their predecessors in the magnificence of their work: thus Darius in his palaces at Persepolis surpasses Cyrus at Pasargadæ, and Xerxes completely eclipses Darius by his Great Hall in Persepolis. The Apadana of Artaxerxes Mnemon is likely to have been far larger than that of Darius,\*



49.—PORTICO OF THE PALACE OF DARIUS, PERSEPOLIS  
(Splers' Restoration).

so that it is of no value to try and fit his decorations in.

Chapter XIII. is devoted to proofs of the authenticity of the Book of Esther, a review of which I will leave to more competent authorities. It is, however, of considerable interest in the analogies which are shown between the main features of the Apadana, such as are recognised by all, and the descriptions given in the Book of Esther.

Chapter XIV. describes a building which M. Dieulafoy calls an Ayadana, a word the interpretation of which is "houses of the gods" (*maisons des dieux*). If the interpretation be true, and the building of which M. Dieulafoy has discovered the

\* In support of this argument M. Dieulafoy accounts for the absence of the Apadana in the bas-relief at Nineveh representing Susa, by the fact that the latter was carved at an earlier date, before the platform was constructed to receive the Apadana of Artaxerxes Mnemon.

plan be an example, it is the solitary instance known. At the same time he points out that Herodotus, Xenophon, and Strabo affirm that the Persians erect neither statues, nor temples, nor altars. As bas-reliefs of figures are found everywhere, and at Pasargadæ there are two altars, the Greek authorities may be in error. The lower portion of some of the walls and of two columns of the Ayadana still remain, and discovery of the pavement, more or less well preserved, has enabled M. Dieulafoy to work out the whole plan. It consisted of a court 55 feet by 50 feet, open to the sky, with a corridor round, a portico in which the columns are set behind the antæ (as in the palace of Darius), and in the rear a hall with four columns carrying the roof, also enclosed with a corridor, with entrances at each end at the top of a flight of stairs. In the centre of the court was the fire altar.

The last chapter is devoted to the description of the various stages of construction by the several races who have occupied Susa—the Elamites, the Achemenidæ, the Seleucidæ, the Parthians, the Sassanians, and the Mahometans, from 700 B.C. to 1100 A.D.—with a general description of the various articles of policy and seals discovered in the trenches, and is illustrated by numerous examples in colour and otherwise.

In terminating this article, if in my description I have treated in too critical a manner some of M. Dieulafoy's restorations, it is more with the view of arriving at some definite conclusions as to the precise nature of these Persian palaces than to find fault with his great work. Considering the serious difficulties with which he had to contend—difficulties which beset Loftus when he commenced the work; the intense heat, the insalubrious nature of the country, the continual troubles involved when searching in the vicinity of a tomb looked upon as sacred by the fanatical Mussulmen, viz., the tomb of Daniel between the river and the tumulus—the unsatisfactory and irregular service rendered by the natives, and difficulties of every kind constantly being raised by the authorities, whose permission it was necessary to obtain—I consider that M. Dieulafoy has not only reason to be proud of his achievements, but in the actual results arrived at, in the embarkation and extradition of the splendid artistic treasures with which he was able to

enrich the Louvre, and in the valuable works which he has produced since as the result of his explorations, his indefatigable industry and research are worthy of all praise; and I must acknowledge the great debt we owe, not only to him, but to his courageous spouse, who not only accompanied him in his travels, but took upon herself no small portion of the work undertaken, including that of the publication of valuable records of the gradual progress of the excavations, and other descriptions of a more popular character.



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# ON THE INFLUENCE OF BYZANTINE ART IN ITALY FROM THE FIFTH TO THE TWELFTH CENTURIES.

A PAPER READ BEFORE

THE ARCHITECTURAL ASSOCIATION,  
JANUARY 13TH, 1893.

AND REPRINTED, BY PERMISSION, FROM THE REPORT IN THE BUILDER.

With which is incorporated some notes reprinted, by permission, from the author's paper on St. Mark's, Venice, read before the St. Paul's Ecclesiological Society, and published in the Society's Journal.

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## SUMMARY.

THE REASONS WHICH PROMPTED THE AUTHOR TO TAKE UP THE SUBJECT—THE ESSENTIAL CHARACTERISTICS OF BYZANTINE BUILDINGS AS EXEMPLIFIED IN THE GENERAL DESIGN OF THE CHURCHES OF THE FOURTH, FIFTH, AND SEVENTH CENTURIES IN CONSTANTINOPLE AND THE EAST—THE SAME AS EXHIBITED IN THEIR CONSTRUCTION AND DECORATION—THE DIRECT AND INDIRECT INFLUENCE OF BYZANTINE ART IN THE NORTH OF ITALY; DIRECT THROUGH THE IMPORTATION OF GREEK ARTISTS AND BYZANTINE SCULPTURE; INDIRECT IN THE ADOPTION OF BYZANTINE FEATURES IMITATED FROM THOSE IN THE EAST—RESULTS OF THIS INFLUENCE AS EXEMPLIFIED IN THE CHURCHES OF RAVENNA, ROME, BRESCIA, MILAN, VERONA, AND VENICE—ANALYSIS OF THE CHURCH OF ST. MARK'S, VENICE; ITS EARLY HISTORY, AND THE RECORD OF ITS TRANSFORMATION IN IMITATION OF THE CHURCH OF THE HOLY APOSTLES AT CONSTANTINOPLE AS DESCRIBED BY PROCOPIUS—THE DESCRIPTION GIVEN BY CATTANEO OF THE SUBSEQUENT DECORATION IN THE TWELFTH AND THIRTEENTH CENTURIES, WITH CAPITALS, CHOIR SCREENS, AND OTHER DECORATIVE FEATURES IMPORTED FROM THE EAST, OR CARVED FOR THEIR POSITION BY GREEK ARTISTS OR THEIR ITALIAN COPYISTS—OTHER BYZANTINE WORK AT TORCELLO AND MURANO, NEAR VENICE, AND AT ANCONA, OPPOSITE THE COAST OF DALMATIA—THE DOMICAL FORM GIVEN TO THE VAULTS OF THE ITALIAN CHURCHES OF THE ELEVENTH AND TWELFTH CENTURIES APPARENTLY DERIVED FROM THE EAST—THE ADMIXTURE OF BYZANTINE AND LOMBARDIC DETAILS IN THE CHURCHES OF PAVIA AND MILAN AND THE GRADUAL DYING OUT OF THE BYZANTINE INFLUENCE TOWARDS THE CLOSE OF THE TWELFTH CENTURY, EXCEPT IN VENICE AND THE NEIGHBOURING TOWNS OF PADUA, VICENZA, AND VERONA, WHERE IT STILL LINGERED UP TO THE FIFTEENTH CENTURY.





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## BYZANTINE ART IN ITALY (AND ST. MARK'S, VENICE).

THE archæological researches of the last fifty years, and the valuable records which have been left to us in the works of Rickman, Willis, Parker, Sharpe, Scott, Street, and Burges among our own countrymen, and Viollet-le-Duc and de Caumont in France, have so far raised the veil of obscurity which hung over that period known as the "dark ages" as to have eliminated from its shadow the second half of the eleventh and the three following centuries. Attempts were made by Hope, Whewell, and Willis to carry back the date, but till within the last few years the entire absence of documentary evidence, the want of a systematic study of the fragmentary remains left to us, and a general inclination to ascribe to buildings a greater antiquity than the civilisation of the precise epoch would admit of, has created some confusion, and failed to penetrate the mystery of the period I have selected for my paper. The subject, however, is so vast that I have found it necessary to confine my remarks to a portion of one country only, viz., the North of Italy, and to the influence of one particular style only, the Byzantine, in the development of its art.

The two books to which I am the most indebted for my information are, de Dartein's *Etude de l'Architecture Lombarde*, completed in 1882, and Cattaneo's work, published 1890, which bears the same title as my paper, except that I have taken another century in order to include St. Mark's and a large series of buildings, which illustrate the extensive influence of the Byzantine style in Italy during the twelfth century.

With de Dartein's work I had long been familiar, and failing

other evidence had acquiesced to a certain extent in the dates given to the various churches illustrated in it. When, however, in the beginning of 1892, I came across Cattaneo's work, and found so wide a difference of opinion, a new interest was awakened, which increased as I followed the arguments brought forward. It was necessary for me to master the facts in order to revise the new edition of Fergusson's *History of Architecture*, on which I was then engaged, and it occurred to me that it might be of some interest to the members of this Association, and induce those of you who in future years have the opportunity of travelling in Italy, to carry further the inquiry. I felt, however, that my statements would come with more authority if I were able to visit some of the monuments in question, so as to be able to differentiate the dissentient opinions expressed by the two authors above named, and also to make drawings, or procure photographs of some of the more important details, which would enable you better to judge for yourselves. I could not hope to get as far as Rome, but in the months of August and September last I visited Como, Milan, Brescia, Verona, Vicenza, Padua, Venice, Ferrara, Ravenna, Ancona, Bologna, Parma, Piacenza, and Pavia, and studied most of the buildings with which the immediate subject of my paper is connected. The Byzantine influence in Pisa and Lucca, and in the South of Italy—at Troja, Bari, Bitonto, Altamura, &c.—is of an entirely different type, and was inspired by the work of the later Greek Empire. In the North of Italy it radiated from Ravenna, and is of much earlier date.

To place my subject clearly before you, I must commence by pointing out the essential characteristics of Byzantine buildings—1st, as regards plan; 2nd, construction; and 3rd, decoration. I shall only be able to touch on the salient points, otherwise my paper would be one on the Byzantine style, which has already been treated by Professor Aitchison at the Royal Academy. When Constantine transferred the seat of empire from Rome to Byzantium, he rebuilt the ancient town, doubling its size; he surrounded it with walls, and divided it into fourteen regions or quarters. The buildings which he erected consisted of churches, palaces, thermæ, forums, &c., all of which would

seem, from the descriptions given, to have been based on those of the Eternal City, with one important difference: they were so hurriedly built, and in materials of so ephemeral a nature, that none of them have been preserved to our day; in fact, many were pulled down and rebuilt by Justinian two centuries later. Two constructions of his time remain—the Bin-Bir Derech, or cistern of the thousand and one columns,\* and the Yeribatan Serai—two large underground reservoirs for storing water. There is one great basilica, built by Constantine, still existing in Syria, viz., the Church of the Nativity at Bethlehem. This church, and those which are described by Eusebius as having been erected in front of the Holy Sepulchre at Jerusalem, and in other places, show us that the type of plan adopted was not dissimilar to those which Constantine built in Rome, viz., the ancient church of St. Peter, pulled down 1506, the church of St. John Lateran, which still exists, and others which have been rebuilt since. In these Roman churches materials from ancient buildings were used up—temples, tombs, and other erections being despoiled to provide columns, capitals, architraves, &c., for them. The church at Bethlehem is a simple basilica, with nave and aisles, the columns and capitals being clumsier and more debased than any examples could be in Rome. From Eusebius's description, the basilica at Jerusalem had triforium galleries set apart for women, according to the requirements of the Greek Church; and these galleries exist in two basilicas of later date at Thessalonica, the Eski Djuma, and the church of St. Demetrius. Both of these churches had timber roofs. From these we pass to the mosque of Sta. Sophia at Constantinople, commenced by Justinian in 532, in which the chief feature is an immense central dome with eastern and western semicircular apses, and with aisles and triforium galleries, all vaulted, surrounding the central space. This church must be looked upon as the apotheosis of the Byzantine style, and no dome of similar size was ever again attempted in the East; but it gave the key to a new plan, which is usually called the Greek cross, in which there is a dome in the centre and barrel vaults over the nave, transept, and choir.

\* There are actually only 212 columns, and they are said to have been originally quarried for some great building in Rome.

In later times this dome was raised on a drum in which vertical windows were pierced, and sometimes other domes of slightly less importance over nave, transepts, and choir, or over the four angles included by them. In the church of the Holy Apostles the four other domes were over the nave, transepts, and choir; in the church of the Assumption at Moscow, on the angles. A second type of plan is found in the round churches, but these do not differ from much earlier examples in Italy; the most important variation, however, is found in the church of St. Sergius at Constantinople, also built by Justinian, a church with an octagonal central space covered by a dome, seven semicircular niches, and a choir, with aisles and triforium galleries all round. Towards the end of the sixth century, in addition to the central apse in Greek churches, two others were added to contain altars for ceremonial purposes. As they were always hidden by the Iconostasis, they served a different purpose from that in the Roman Church. It is, perhaps, more a question of construction than of plan, but I may here note that whilst internally in Byzantine work the apse is circular, externally it is almost always polygonal.\* In Western Europe it is always circular unless influenced by Byzantine work.

I come now to the second section, that of Byzantine construction. Besides the architects and workmen whom Constantine took with him to Byzantium, he is said to have exported other treasures, and not only bronzes and marble statues, but even columns and capitals. It was evident, however, that these would, in course of time, come to an end, so that he was probably soon obliged to have recourse to whatever materials were at hand. Of timber he had plenty, but there was no stone except of small dimensions, unless it were imported from distant quarries. The means at his disposal were apparently not sufficient to enable him to undertake those stupendous works in concrete, one of which—the basilica of Constantine in the Forum—he had completed in Rome, and which still exists in part after fifteen and a half centuries. He was obliged, therefore, to do the best he could with rubble

\* The exceptions are the Pantokrator, Constantinople, St. George's, Thessalonica, and the churches in Central Syria.

masonry or with brick, the materials for making which were abundant in the vicinity of the new city. De Dartein points out in his work that brick, when employed as the chief material, exercises a considerable influence on architectural design, on account, 1st, of the regularity of its form and, 2nd, of its restriction in construction. It offers great facilities for the employment of arch construction, and tends to replace the architrave or lintel. It restricts the projections of cornices, and, on account of its numerous joints, it suggests the employment of relieving arches supported on piers, leaving the walls to be filled in afterwards as partitions. What may have been the tentative efforts of Constantine and his immediate successors we know not; the buildings of Justinian's reign already mark the invention of a new style of construction; immense arches, measuring sometimes 5 feet high, of brickwork in two or three rings, with huge piers and buttresses, are employed in the churches of Sta. Sophia at Constantinople and Thessalonica, the bricks measuring from 18 inches to 20 inches by 12 inches, and  $1\frac{1}{2}$  inches to 2 inches thick, with joints of mortar of nearly the same thickness, and at the extrados of the arch still greater. Even in smaller openings, from 3 feet to 6 feet span, brick arches of 16 inches or 18 inches depth are used instead of two or three  $4\frac{1}{2}$  inch brick rims which we employ. (In the campanile of St. Apollinare-in-Classe, Ravenna, I noted a window 6 inches wide with voussoirs 14 inches deep. In this case special voussoirs had been made 1 inch thick at one end and 3 inches at the other, the mortar joints also differing in thickness in the same way.)

In the construction of their vaults there is a much more important change from Roman work, and from the fact that the two great cisterns (already spoken of) in Constantinople were vaulted in the new manner, we may assume that they were built by Eastern workmen, who carried out the traditional method of building domical structures employed by the Assyrians. In these days and here in England, where Baltic timber is to be had in any quantity and at small cost, we do not hesitate to employ centering for every description of arch, centering which afterwards becomes waste timber. In early times, however, they built without centering, and M. Choisy's

book on *L'Art de bâtir chez les Byzantins* illustrates a large number of methods by which this could be done.

The vaulting surfaces were always domical, so that when complete each ring was self-supporting, and by building the rings on an inclined plane, with the bricks flat wise and not end-on, each ring was partially supported by the one beneath. This method allowed of a less thickness being given to the vault, and reduced considerably its thrust.

Geometrically speaking, whilst the surface of a Roman barrel vault is evolved by a semicircular ring travelling along horizontal line, in Byzantine vaulting the line rises and is curved. This is only the elementary form, but in its inter-sections it follows the same principle.

The Byzantine architects would seem also to have recognised at a very early period the fact that a pier or support of a homogeneous nature such as granite, marble, or stone could carry a greater weight than one built up of bricks; and further, that it might even be of less diameter than the wall carried, provided all lateral thrusts were counteracted. Now in all Roman work the face of the architrave (and in late work, as at Spalato, the face of the arch) is in the same plane as that of the front of column. In the church of St. Paul, outside the walls of Rome (built 388 A.D.), where arches are thrown from column to column, the thickness of the wall and the width of the die from which the arches spring is equal to the upper diameter of the column. In Byzantine work, however, both are much greater. Consequently, the Roman capital, with its ordinary abacus, was neither large enough nor sufficiently strong to meet the new requirement. They inserted, therefore, a new feature called the dossier, or impost block, between the capital and the wall above. It has been thought this was a corruption of the old Roman architrave. If so, its earliest examples would recall the mouldings of same, but in the Eski Djuma, at Thessalonica, dating from the beginning of the fifth century, it appears as an absolutely new and original feature, designed solely to meet a constructional want, and without reference to precedent. It is not necessarily square, and sometimes two of the sides will project like a bracket. The dossier, therefore, is one of the most characteristic features of the Byzantine style.

I come now to the third head, decoration.

Of external decoration, beyond that which is afforded by the courses of brickwork or by the brick voussoirs, in which variety is given occasionally by difference of tint, and in later work of the eleventh and twelfth century, when patterns of brick or inlaid tiles were employed, there is not much to be said. It was rather in the interior that the Byzantine artist lavished the resources of his art. In the decoration of the lower part of the walls with panellings of the richest marbles, and of the upper portion and of the vaults and soffits of arches with a vast surface of mosaic, the Byzantines carried on the traditions of Roman architecture, but the treatment was new and original. They restricted the carved decorations to those features which had special constructional functions to serve, such as the capitals and bases of the columns, the lintels and jambs of doorways and windows, or such as were required to emphasise certain lines in the buildings, as string courses or cornices. In all these features they were specially reticent as regards their projection, so as not to clash or form too great a contrast with the large flat surfaces of marble or mosaic. Though many of their capitals were based on those of the Roman Corinthian, or Composite orders, we notice a tendency to change: firstly, the contour of the capital, which inclines from the bell towards the form known as the cushion capital, and, secondly, the leaves, instead of being so much in relief as to suggest that they were in their origin applied to the bell, on the contrary, seem rather to emerge from the solid block. These tendencies become the more apparent when, with a cubical block (the lower angles of which had been chipped off to merge into the circular annulet of the column), they proceeded to set out a scheme of surface decoration and cutting back from the surface, and to evolve a new variety of design, partially geometrical and partially of leaf ornament. It is in this class of capital that we find the greatest originality, and in the play of light and shade considerable beauty. In these examples also they seem to have been very fond of undercutting. Piercing holes with a drill is found in the debased work of most styles, but the Byzantine artists turned its effects to more account, and frequently employed it in conjunction

with carved foliage of good character. The influence of Byzantine design, however, is chiefly conspicuous in the decoration of the enclosures of choir screens, parapets of balustrades, episcopal thrones, ambones or pulpits, and baldacchinos or ciboria. To the results of such influence I will draw your attention later on.

Although the early history of the Byzantine style can be carried back a century or more before the foundation of Constantinople, its influence on Italy was not felt till the Empire had become well established; in fact, more than a century elapsed before we find it in the ancient baptistery, the tomb of Galla Placidia, and the chapel of St. Chrysologus in the Archiepiscopal Palace, all in Ravenna. In these examples it is shown chiefly in the mosaics with which they were decorated, and which were probably executed by Byzantine workmen. The baptistery at Ravenna is said to have been built by Archbishop Ursus in 380 A.D., but this refers, I think, to the main structure, which probably was originally covered with a wooden roof. When in 451 A.D. it was determined to decorate it with mosaics, the vault was probably built to receive them. There is no documentary evidence of this statement, but the internal structure suggests that a change from the original design has taken place. In order to bring the thrust of the cupola well within the walls, it would seem to have been lined with eight arcades of two storeys, which project inwards about 16 inches, and the pendentives are carried on corbels projecting 10 inches more. Now, whilst the exterior of the baptistery shows no Byzantine influence in its brickwork and cornice, three of the capitals which carry the lower arcade inside are Byzantine, and all are surmounted with the Byzantine dossier. The dossier appears again on the Ionic capital of the upper arcades, and the width and depth of the springing base of the arches are greater than the diameter of the column. The corbels carrying the main arches and the pendentives are sculptured with Byzantine foliage. Under each arch of the upper storey are three arcades, the centre one pierced with large windows of modern date, the side arcades decorated with niches and figures in low relief, all executed in plaster. I noted these at the time as being peculiar,



and subsequently, in the museum at Bologna, I came across some Byzantine ivory tablets of similar design.

Whilst the mosaics of the tomb of Galla Placidia and probably the dome on pendentives (the earliest example known) are Byzantine, the walls of the building were built by native workmen, and the bricks are much thicker and of less lateral dimensions than those in St. Vitale and other churches in Ravenna of the sixth century.

The next example in date is in Rome, where in the church of St. Stefano Rotondo (see Ill. 50), in the outer ranges of arcades above the capitals we find the Byzantine dossier, and a similar feature is said to exist in S. Angelo at Perugia.

The dossier is found also in that eastern portion of the church of St. Lorenzo fuori-le-Mura at Rome, where, in fact, it might have escaped attention except that its capitals are fine Byzantine examples crisply carved, and they support the arches of a triforium gallery which I have referred to as an essentially Byzantine feature. Except in St. Lorenzo (where they were added by Pope Pelagius about A.D. 585), and in St. Agnes in A.D. 630, the dossier is not found in any other basilica in Rome.

For the next important examples I must now return to Ravenna. Ravenna, I might here point out, was selected in preference to Rome as the capital by Honorius in 396 A.D., and from that time for some centuries it was occupied as such by the reigning sovereigns; hence the importance of its buildings. Theodoric, King of the Ostrogoths, who reigned from 493—525 A.D., would seem, architecturally speaking, to have been a very remarkable man, having erected more monuments than even the later Roman Emperors. As the Goths, however, had formed no style of their own, he employed such artists as were at his service, and in the additions he made to the baths of Caracalla in Rome, and in the churches he restored there, he insisted on the ancient Roman style being carried out in its integrity. "We owe everything," he said, "to the Roman artists." For the new works, however, which he proposed to build in Ravenna, he imported artists from Constantinople with whose work he was well acquainted, having spent part of his life in the Byzantine capital. The palace which he built, and of which a fragment only remains,

is an imitation of the golden gateway by Diocletian at Spalato, but in it we find, perhaps, the earliest instance of the large thin bricks or tiles which are so characteristic of Byzantine construction. Judging by the mosaics on the walls of St. Apollinare Nuovo, in which the palace is represented with columns of two dimensions, the general design was Roman. Theodoric's principal work still exists in the great church of St. Apollinare Nuovo, a fine basilican church with twenty-four marble columns, said to have been brought from Constantinople, but more probably procured from one of the Greek quarries by permission of the Emperor. They carry capitals of debased Byzantine work, and have dossierets carved with crosses; the archivolt mouldings of the arches above them are debased Roman. The entablature which takes the place of the impost mouldings of the responds is so Roman in its execution that it might almost have been taken from some ancient edifice. It is decorated with console brackets alternating with bulls' heads. The existing choir and apse are of later date, though the Byzantine influence is shown in the polygonal exterior of the latter.

We now pass on to the church of St. Vitale, which was built by St. Ecclesius, Bishop of Ravenna, on his return from Constantinople, 535 A.D., the design of which was based on the church of St. Sergius in that town. Except that, in accordance with native custom, the vaults of the triforium galleries and the central domes are covered with timber roofs (necessitated probably by the difference in climate, and this constitutes the main distinction between Eastern and European domes), the whole construction is so Byzantine that it must have been designed by Greek workmen. Owing to the timber roofs over the triforium galleries it was necessary to raise the hemispherical dome higher than in St. Sergius, so as not to interfere with the eight windows with which it is pierced. Whilst in St. Sergius the lower storey of the eight semicircular recesses has columns carrying architraves, in St. Vitale the storey is loftier, and there are arches. The capitals of the lower storey are of the same peculiar basket type (Ill. 50 A) we shall find in St. Mark's, but they are not so fine in execution, which suggests that they were carved on the spot by second-rate



50.—ST. VITALE, RAVENNA. CAPITALS OF UPPER GALLERY.



Greek artists; whilst those of the upper storey (Ill. 50 B) were probably imported from the East. These capitals and those of the choir are identical in their design with examples in Constantinople and in Thessalonica. The vault is constructed, for the sake of lightness, with earthen pots fitted one into the other. This system was adopted in the outer aisles of St. Stefano Rotondo, which were vaulted, and in other earlier examples in Rome.

The great basilica of St. Apollinare-in-Classe, three miles from Ravenna, was being erected about the same time, 535—545 A.D. Its capitals are much more clumsy than those of St. Vitale, and although they are based on examples at Thessalonica, the design and execution are due to inferior Greek sculptors. The responds of the nave arches are decorated with ornament in plaster; though clumsy, they are vigorous in treatment, and may have suggested the design of the capitals of the court of the town hall at Bologna of the fourteenth century. Here and in St. Apollinare Nuovo the soffits of the arches of the nave are decorated with coffers in plaster, which are, I think, of later date—in fact, sixteenth century work. The archivolts in both churches are in stone, and close copies of Roman work, which suggests that they were worked by native carvers.

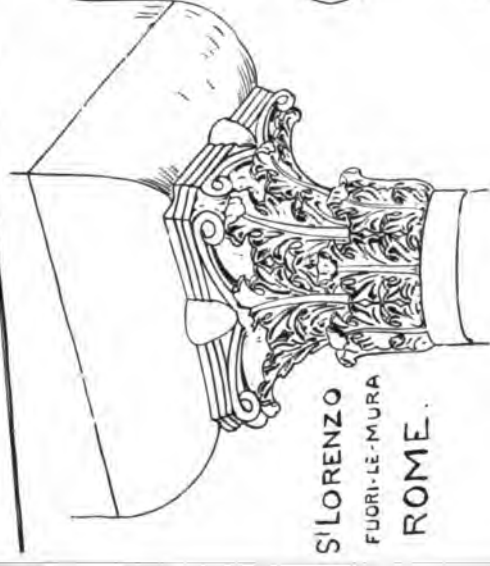
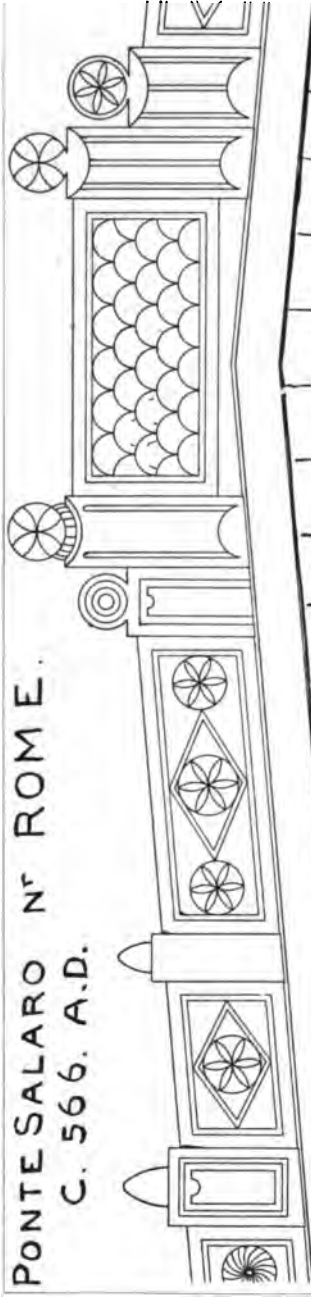
The church of Sta. Agata is said to date from the fifth century. It is a basilican church, with twelve arcades on each side carried on columns. Many of the capitals, however, belong to the sixth century, and were not carved for the church, whilst others are barbarous copies of the eighth or ninth century. The church was about to be restored when I visited it, and the responds having had their plaster surface scraped off, exposed the arches of the original church, which were carried on piers instead of columns. In Rome, where they had abundant resources, they were able to take the columns from ancient buildings, but in Ravenna they were obliged to content themselves with piers unless, as in the three churches before-named, they were privileged by the Greek Emperor to obtain them from Greek quarries. Square piers, however, were much in the way, so that probably in the ninth century, when there seems to have been a revival in church building in the

North of Italy, the church of Sta. Agata was partially rebuilt, and with materials from more ancient structures. Some of the columns and capitals in this church may possibly have been taken from the palace of Theodoric. Four of the columns are in granite. The ancient apse still exists, and is polygonal externally. The height of the springing of the ancient arches was 7 feet 6 inches from the floor of the existing church. I have since ascertained that further excavations have been made, and the original floor of the fifth century church, laid with cubes of mosaic  $\frac{1}{2}$  inch square, has been found at a depth of 8 feet below the present church, which is on the same level as the street; so that if we allow 2 feet for the steps entering the original church, the street has risen 10 feet between the fifth and this century. In St. Apollinare Nuovo the base is 18 inches below the pavement, and in San Giovanni Evangelista the ancient columns lately found about 5 feet; but these two churches may have had loftier flights of steps in front.

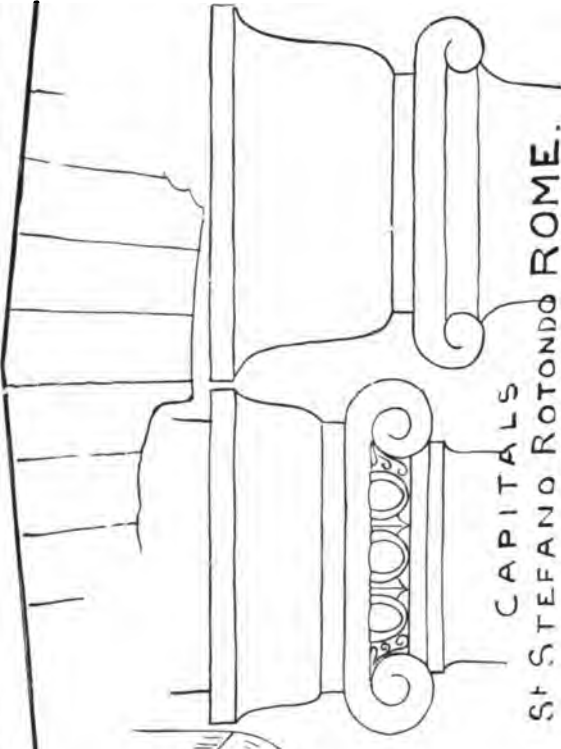
There are two or three other churches of early date in Ravenna, such as San Giovanni Evangelista and other basilicas of the ninth century. Some of the columns of the earlier church of San Giovanni have lately been found embedded in the west wall, and they are of much greater size, and possess much finer capitals than those in the existing church. In all these examples of the fifth and sixth centuries the Byzantine influence is shown in the dimensions of the bricks used, which measure 18 inches to 20 inches long, by 12 inches to 13 inches wide, and about  $1\frac{1}{4}$  inches thick, with mortar joints of the same thickness. And this gives a style and a character which are quite unmistakable. The apses also, when ancient, are all polygonal externally. Passing to other towns, the church of St. Lorenzo, at Milan, was rebuilt in the sixteenth century, but on the ancient plan. At present it is an octagonal church with four semicircular apses, each with vaulted aisles round them and triforium galleries over. It was originally the cathedral of Milan, and was mentioned in the eighth century as being remarkable for its beauty and magnificence. It is considered by de Dartein to have been originally a square building with hemispherical dome carried on pendentives. If so, it was probably based on Sta. Sophia at Constantinople; but, not



PONTE SALARO N° ROME.  
C. 566. A.D.



S' LORENZO  
FUORI-LE-MURA  
ROME.



CAPITALS  
S. STEFANO ROTONDO ROME.

51.—WORK IN ROME SHOWING BYZANTINE INFLUENCE.



venturing to throw a dome of such dimension, they increased its size internally by having four semicircular apses instead of two. The diameter of these, however, was only about two-thirds of the width of the central space, in order to obtain proper abutment for the arches, and avoid the difficulty which had been experienced by Justinian in Sta. Sophia; in addition to this, they built a tower at each angle. In the beginning of the twelfth century the dome fell in, and it was replaced by an octagonal one, carried on arches thrown across the angles. It was rebuilt in 1575, and, according to the letters of the architect, on the old foundations, but this time additions were made to the angle piers, which have transformed it into an octagonal church, but as the sides at right angles to the diagonal lines are narrower than the others, there are still arch pendentives above to carry the dome, which is a regular octagon. The church is so enclosed that very little is visible of the external structure; the only tower I could see is built (about 20 feet above the ground) with the Byzantine type of brick I have already referred to.

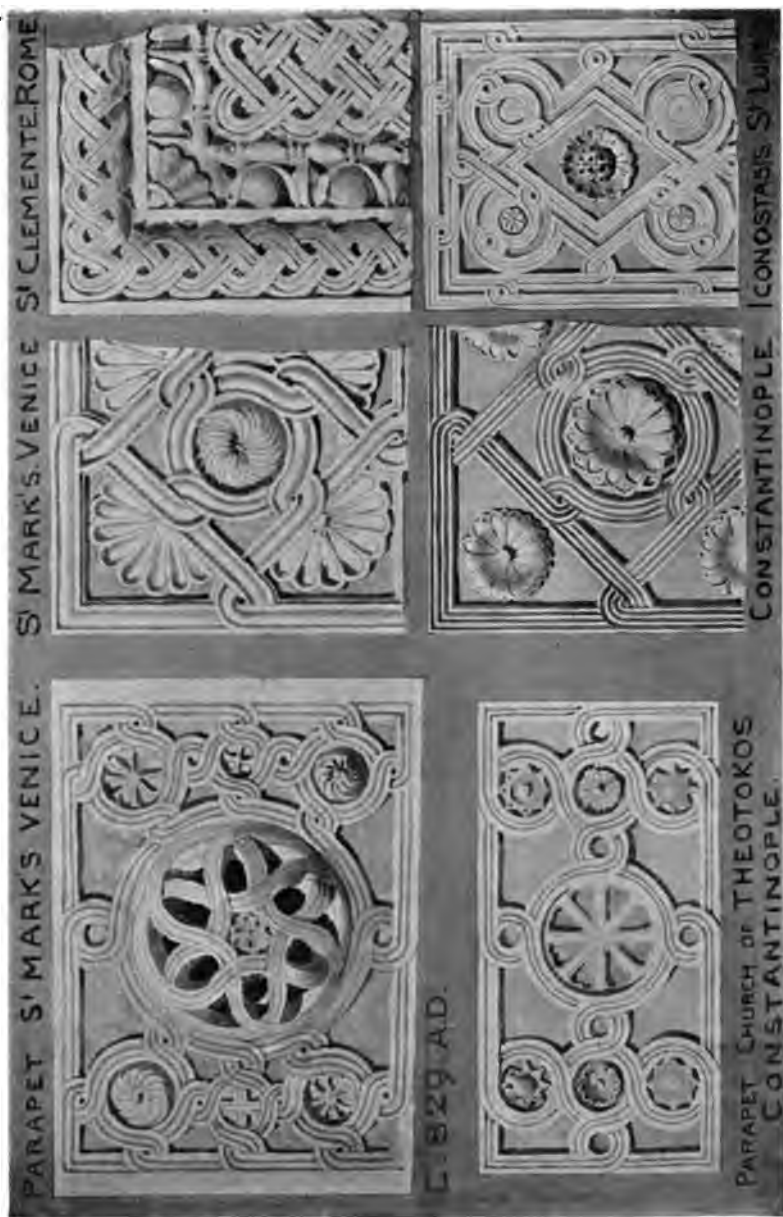
The church of San Fidele, at Como, of the twelfth century, seems to me to be based on St. Lorenzo, except that there is a regular nave instead of one of the apses. Triforium galleries also existed except round the eastern apse, where there is only a passage.

So far I have dealt with churches. I have now to direct your attention to other buildings and what I have called church furniture, such as choirs, screens, ciboria, ambones, &c. There existed prior to 1873 a bridge near Rome called the Ponte Salaro (shown in Ill. 51), which was built by Narses, Justinian's general, on the foundations of a Roman bridge. Its interest laid in its showing the Byzantine method of building parapets. Square upright posts of stone or marble are sunk at intervals, the interspaces being filled with slabs of marble which are fixed in grooves worked in the square posts (see Ill. 51). The posts are sometimes plain and sometimes moulded or sunk in panels; the decoration is found in the panels, and those of the Ponte Salaro have designs on them similar to many examples in Sta. Sophia and elsewhere (as in Ill. 52).\*

\* Only the Roman foundations and the small Byzantine archway on each side are preserved in the existing bridge, which was rebuilt in 1873.

St. Clemente at Rome, the enclosure of the choir (which projects far into the nave) is formed of upright marble posts panelled (Ill. 52), and slabs of marble which were removed from the more ancient church, the walls of which have been discovered below the existing one. In 1858, when the lower church was discovered, an inscription was found on a marble architrave which enabled M. Cattaneo to fix the date at 514—525 A.D., and the sculptural decoration on a column found with it was of the same epoch as the panels of the screen. This parapet or screen is, therefore, the earliest dated example in Italy of that peculiar interlaced decoration of which so many examples exist in Ravenna, and which was either imported from Constantinople, or was carved by Byzantine workmen. Of these interlaced panels there are at least eight in Ravenna; four perfect examples are now in the cathedral, having been preserved when it was rebuilt. Three are in St. Apollinare Nuovo, and one in the museum. There are some in Rome, cited by Cattaneo, and a more diligent research might reveal the existence of others. They are all types of that peculiar interlacing pattern which influenced Lombard architecture down to the end of the twelfth century, and which, even up to the fifteenth century, in Venice, Verona, and other towns near, crop up occasionally. The Renaissance parapets in Verona and Venice owe their origin to this simple but highly decorative method of enriching a pierced parapet.

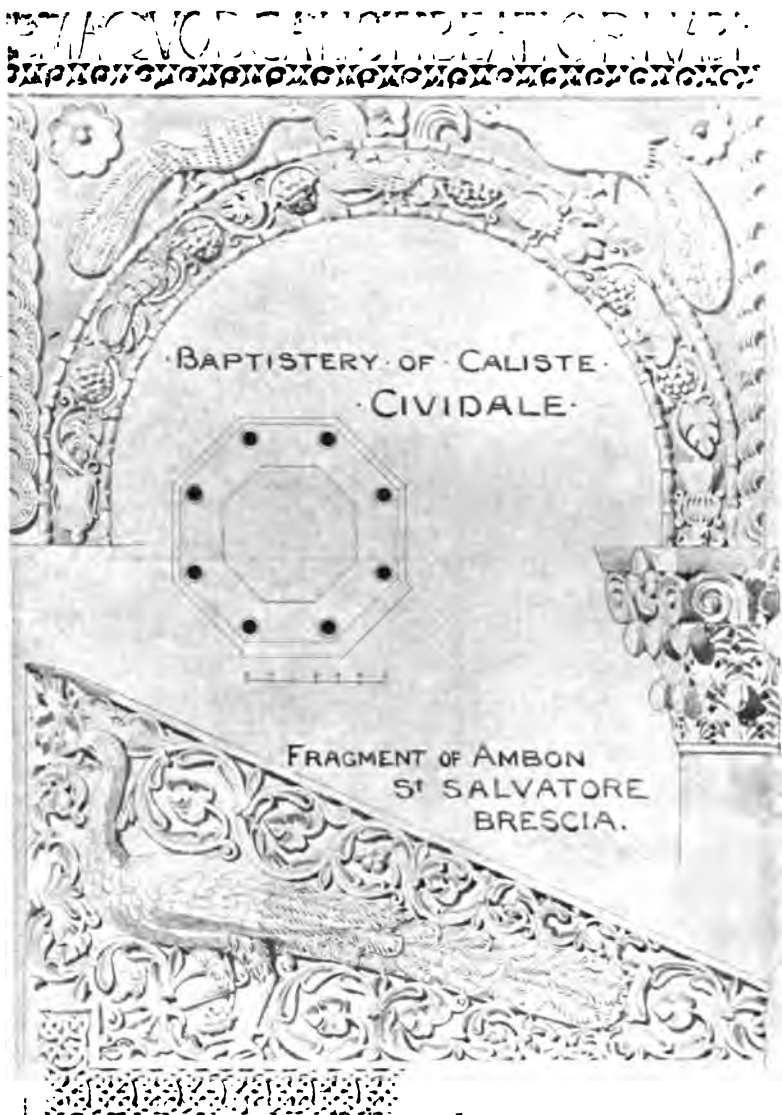
The buildings or features which I have already quoted were executed in the fifth and sixth centuries. In 566 A.D. Italy was subject to a series of disasters. The plague, great floods, intense cold, swarms of rats, and clouds of locusts followed one after the other, and in addition to these troubles there were constant incursions of the Northern barbarians, followed by slaughter, pillage, and general destruction. All this put a stop to the cultivation of art, and either killed off or exiled those foreign artists who, with their families, had settled in the country. A century and a half passes without the production of any works except of a barbarous character. A revival seems to have taken place in the beginning of the eighth century, when Liutprand occupied the throne of Lombardy. About this time, 726, the first edict of the Iconoclasts was



52.—PARAPETS AND CHOIR SCREENS IN ITALY AND BYZANTIUM.







53.—WORK IN ITALY SHOWING BYZANTINE INFLUENCE.

promulgated, and a considerable immigration of Greek artists into Italy took place (it is possible also that the Mahometan invasions exiled some from Syria); their work would seem to have been confined, more or less, to the decoration of apses with mosaics, and to such ornamental works as ciboria or baldachinos, ambones or pulpits, choir enclosures, &c., as, for



54.—PORTION OF EIGHTH CENTURY CIBORIUM—NOW ON TOMB  
AT BOLOGNA.

instance Ill. 53. Of these the most remarkable are the ciboria at Valpolicella, Cividale, and Bologna (Ill. 54, now forming part of a fourteenth century tomb there), St. Apollinare-in-Classe, and other places, the greater number of which are now in museums. The most important church built, and which still remains fairly perfect, is that of Sta. Maria-in-Cosmedin at Rome, 772—95, and as it was built for the Greeks who had been exiled by the Iconoclasts, and is the first example in Italy of a church with three apses, we may

fairly ascribe that feature to Byzantine influence, though as I have before observed, in the Greek church the side apses are not dedicated to any saint, and, in fact, are hidden by the Iconostasis. The church of San Salvatore at Brescia (the finest work from which is now in the museum there), and the crypt of St. Filasterio, under the east end of the Rotonda, are the only two structures out of Rome belonging to this century which seem to have retained their ancient plan. They are more numerous in the ninth and tenth centuries, as, for instance, in Rome, the church of Sta. Maria in Domnica, the only one which has preserved its original basilican plan with three apses—(I am, of course, only speaking of those in which I recognise the Byzantine influence)—the chapel of San Satiro at Milan, which is like a small Greek church—St. Vincenzo in Prato, at Milan, a church which has just been restored, having been closed for more than a century: it is a simple basilican church, with nine arcades on each side carried on columns and capitals with dosserets, some taken from ancient buildings and others carved for the church, three apses and a crypt with choir above, rising from 7 feet to 8 feet above the nave; (the baldacchino also dates from the ninth century, being somewhat similar to the example in St. Ambrogio)—the church of Agliate, near Milan, which dates from the same period, consists of nave without aisles. [There also is a baldacchino, and it is curious that in all these three, viz., St. Vincenzo, St. Ambrogio, and at Agliate, the raised interlaced ornament of the upper portion is in stucco (Ill. 55) or plaster, painted and gilded. The rich archivolt decorations of the narthex of Agliate are also in plaster, as also are those of the church at Cividale.] These and other examples of similar decoration are illustrated in Ill. 55—the church of Sta. Agata, St. Francesco, and others in Ravenna—portions of St. Eustorgio at Milan (but much altered in the twelfth century)—the exterior of the apse of St. Celso at Milan—the apse with triforium gallery of St. Stefano at Verona—the churches of Sta. Euphemia and St. Giovanni Decollato at Venice, the latter with elliptical arches in nave, which are said to exist in the cathedral of Caorle, to the north-east of Venice. This egg-shaped form of arch is one which was largely adopted by the Sassanians, but I have come





55.—VARIOUS DETAILS FROM THE EAST AND IN ITALY.

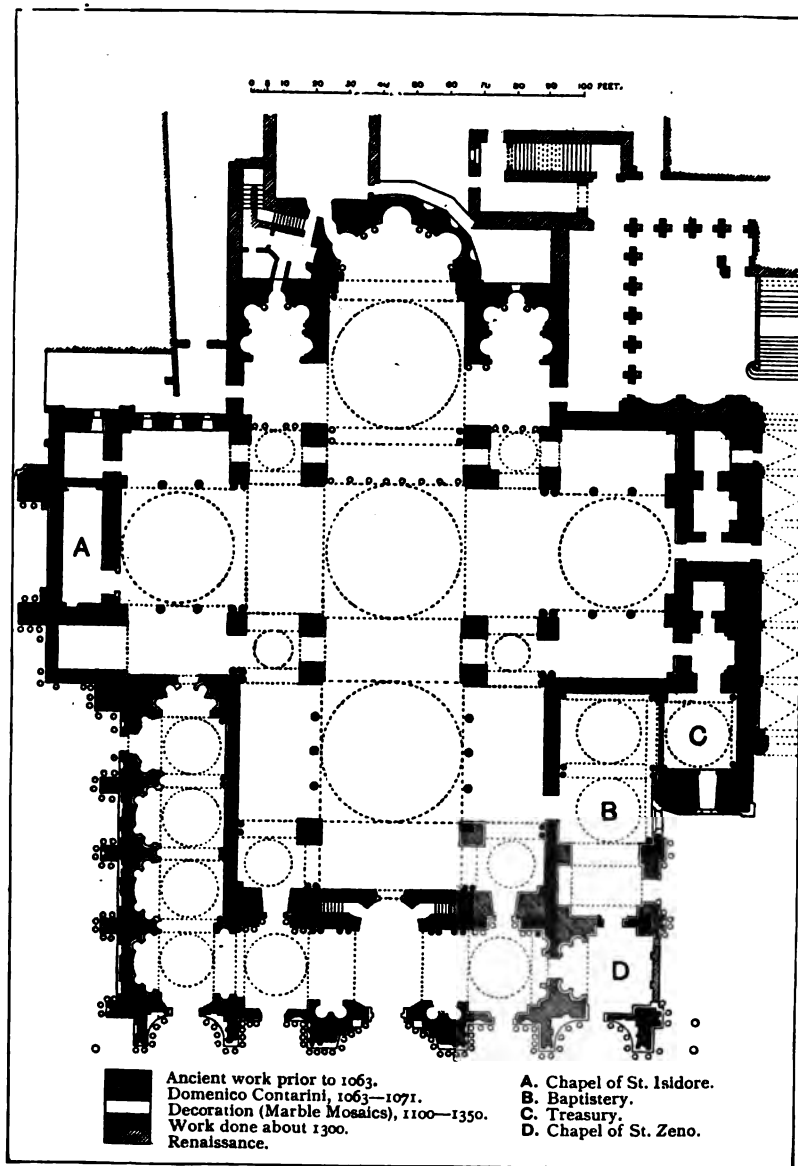


to the conclusion that the resemblance is accidental, and that instead of stiling the arch at St. Giovanni, to bring its crown on a level with that of the last and wider arch of the nave, they made it elliptical.

The chief interest of all these examples of the ninth and tenth centuries lies in the fact that they constitute the early examples of Lombardo-Byzantine work. The great artists who came over during the Iconoclastic persecution remained only till the end of the eighth century, and the Lombards were then left to themselves to work out their own style. When compared with the finer works of the fifth and sixth centuries at Ravenna, these later examples show a miserable falling off. Whenever possible they utilise old materials, so that in all these churches (which are of the usual basilican type, with nave and aisles separated by arcades, carried on columns, and out of Rome invariably with the dossier above the capital) we find old capitals used up with a few new ones of coarse and naïve execution in imitation of the old examples. The triple apse reigns throughout, and here and there we come across the polygonal exterior to the apse as in St. Fosca, Torcello, at Murano, in the side apses added afterwards, in St. Apollinare-in-Classe, and the extended one in St. Apollinare Nuovo. There is invariably a crypt, which, in some cases, is only a few steps down from the nave, resulting in a raised choir, as in St. Ambrogio and St. Vincenzo in Prato, Milan. The principal treasures of these churches are the sculptured parapets of the choir—the ciboria and the pulpits, and in churches of later date, as well as in museums, we find richly carved slabs, as in St. Abondio, Como, and capitals, as in St. Giovanni, in Valle, and St. Stefano, in Verona, and, although of far less beauty than the earlier Greek examples, exhibiting an interesting and naïve revival of interlaced work, scrolls, and the more favoured patterns of the vine and grapes, which is found in twelfth and thirteenth century work, and even later.

I now come to the cathedral of St. Mark's, Venice, a building which, inspired throughout by Byzantine work, and of which the main design was certainly due to a Greek architect, seems to me to have exercised the greatest influence on the Lombardian architecture of the twelfth and succeeding centuries.

The early history of the present cathedral and of its predecessors has been traced by Cattaneo, to whom I am chiefly indebted for my information. It commences with the recovery of the body of St. Mark by Giustiniani Participazio in 829. In that year the Mahometans of Egypt had determined to pull down the church of St. Mark at Alexandria, and the Doge Participazio succeeded in obtaining the relics of the saint in whose memory it had been erected. Nothing remains of this church at Alexandria, but it is believed to have occupied the site of the present Lazaretto. Giustiniani Participazio intended to erect a church worthy of these relics, but died before it was commenced, leaving the task to his brother, Jean Participazio, who succeeded him as Doge of Venice. The church was built between the site of the then existing ducal palace and the church of St. Theodore, which had hitherto been the chapel of the ducal palace. The church he built was probably of the usual basilican type, and in it were used up the marble columns and capitals which his brother Giustiniani had exported from Sicily after his conquests there. It is probable, also, that some of the materials were obtained from the ruined cities of Heraclea, Altino, Concordia, and others, for examples of all periods are found in the present church. In 976 A.D. the ducal palace was set fire to by an enraged populace, and the Doge, Pietro Candiano, was killed. The fire spread to St. Mark's, and partially destroyed it. The new Doge, Pietro Orseolo, commenced at once the restoration of both palace and chapel, but as he retired to a convent within two years, it is scarcely probable that he can have done more than to restore the old church to its primitive form, and there is no record of a continuation of building in succeeding years. It is quite impossible that so important a structure as the present St. Mark's could have been erected in so short a space of time as two years, and as long ago as 1859, Selvatico, an Italian antiquary, disputed the accuracy of the tradition, having discovered a document in the archives of Venice stating that Domenico Contarini (1043—1071) built the church of St. Mark's. 1063 A.D. is the date accepted by Cattaneo for its commencement, the same year that the rival republic of Pisa commenced its cathedral. As Contarini became Doge of Venice in 1043, it is



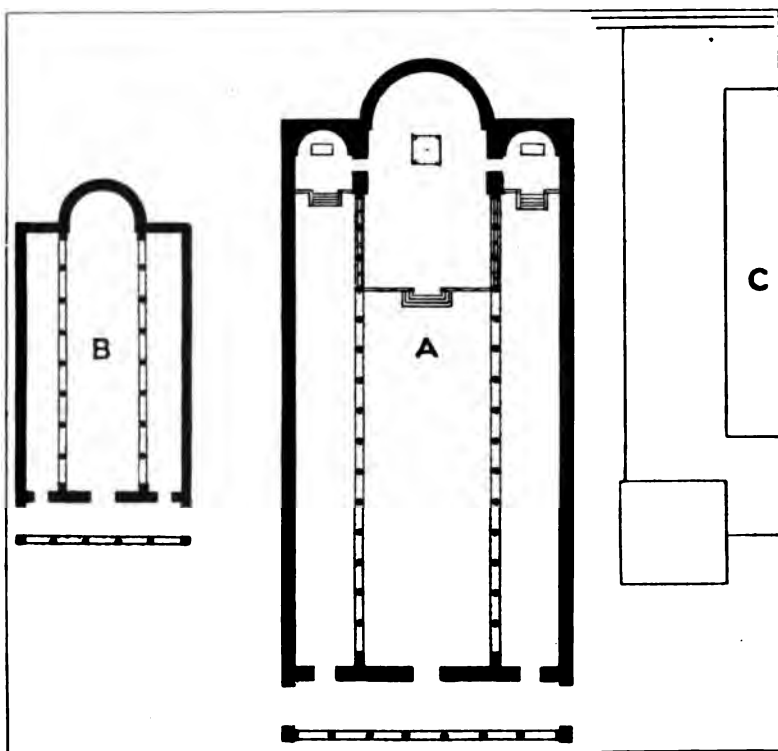
56.—PLAN OF ST. MARK'S, VENICE.

probable that long before 1063 the project was in contemplation. For the provision of ways and means there was no difficulty, as the Treasury of Venice was then richly stored, and it was a question of setting forth on some new conquest or rebuilding a cathedral; fortunately for us they decided on the latter. Where to place it, however, was another matter. The church of St. Mark's was built, as I have said, between the ducal palace and the church of St. Theodore, 16 feet from the former, 32 feet from the latter (Ill. 57). Its west front projected quite as far beyond the ducal palace as was thought desirable, and a further extension on the east side would only have increased the church to too great a length. The result of the deliberations would appear to have been—to pull down a portion of the ducal palace on one side and the church of St. Theodore on the other, and to extend the building north and south by the addition of huge transepts. It was here that the Greek architect came in apparently, who showed them, that by following the model of the church of the Holy Apostles at Constantinople, they could retain portions of the walls, and, without increasing the length, obtain an immense space in the centre. Early records state that the reconstruction was based on the church of the Apostles at Constantinople; this church, however, was pulled down in 1464 by Mahomet II. to build a mosque on the site, so that we have only the description of this church given by Procopius, the historian of Justinian's time, to go by. Now Procopius states: "In ancient times there was one church dedicated to all the Apostles, but through length of time it had become ruinous and seemed not likely to stand much longer. Justinian took this entirely down, and was careful not only to rebuild it, but to render it more admirable both in size and beauty. He carried out his intention in the following manner: Two lines were drawn in the form of a cross, joining one another in the middle, the upright one pointing to the rising and setting sun, and the cross line towards the north and south wind. These were surrounded by a circuit of walls, and within by columns placed both above and below. About the middle point there is a place set apart, which may not be entered except by the priests, and which is consequently termed the sanctuary. The transepts which lie on each side of this, about

the cross line, are of equal length, but that part of the upright line towards the setting sun is built so much longer than the other part as to form the figure of a cross. That part of the roof which is above the sanctuary is constructed like the middle part of Sta. Sophia, except that it yields to it in size, for the four arches are suspended and connected with one another in the same fashion; the circular building standing above this is pierced with windows, and the splendid dome which over-arches it seems to be suspended in the air. In this manner the middle of the roof is built; but the roof over the four limbs of the church is constructed of the same size as that which I have described over the middle, with this one exception, that the wall underneath the spherical part is not pierced with windows." Now Procopius was not an architect, therefore we must read between the lines of his description, and when he says the church was surrounded within by columns placed both above and below he is evidently referring to the columns of aisles and triforium galleries, as in Sta. Sophia. If that reading be accepted, then the only differences between St. Mark's, Venice, and the church of the Apostles, Constantinople, are—firstly, there is only one range of columns, viz., in the lower storey which carries the gallery, and the upper range of column in wall with windows above, as in Sta. Sophia, is omitted, the windows being in the outer wall above the aisles. Secondly, there are windows at St. Mark's in the four other domes; and, thirdly, the galleries were replaced by narrow passages in the thirteenth century. Otherwise he might have been describing the plan of St. Mark's, viz.: a Greek cross, with the west end a little longer—dome over the crossing, and four other domes over the limbs, viz., nave, transepts, and choir.

Now I have already pointed out that Participazio's church, restored by Orseolo, was erected between the church of St. Theodore and the ducal palace, 32 feet from the former, 16 feet from the latter (Ill. 57); and it is here that the late restorations of St. Mark's have been of such value in testing the validity of the new theory. The wall which separates the chapel of St. Isidore from the north transept, when stripped in 1887 of its marble casing, showed a bare surface of bricks, blackened by exposure to the weather, which proved it to be an

ancient wall ; and, further, a window with stone dressings was found, 9 feet from the ground, fitted with an interlaced wrought-iron grating on the side of transept, and, on the other side with the jambs splayed off. This was one of the windows which lighted the south aisle of St. Theodore. The outside of the



*Piazza St. Marco.*

57.—PLAN SHOWING POSITION OF OLD ST. MARK'S.

A. Chapel of St. Mark.      B. St. Theodore.      C. Ducal Palace. \

north wall of nave (now the south side of the north atrium), was exposed in 1885, and it was also found to have been blackened by exposure to the weather, showing it to have been the ancient wall of Participazio's church, 76 feet long and 26 feet high. On the south side the antæ of the original narthex were discovered, so that it is fair to assume that the south wall of nave below

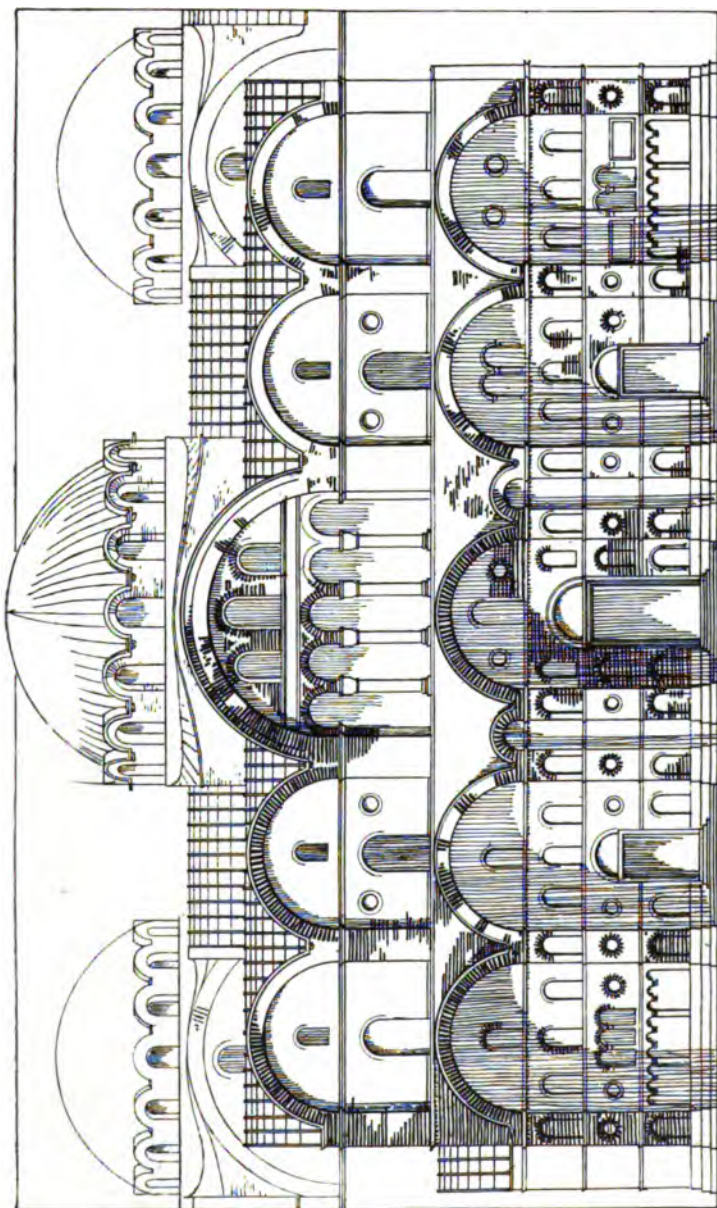


the baptistery and the south aisle, as also the west wall at back of atrium, are both the ancient walls of the original church (Ill. 56). If any further proof were required, I think it would be found in the fact that, where an old wall existed, columns were erected against it to carry the vaulting, as in the atrium and baptistery; whilst on the opposite sides it was carried on the wall.

Cattaneo was of opinion that the early church did not extend to the same length as the present cathedral, basing his theory on the existence of a low crypt on the west side of the present crypt and raised choir. Since his death, however, it has been ascertained that this substructure was not a crypt, but was built to carry the floor of the whole structure, and exists throughout, its object probably being to keep the church dry. It was the sinking in the pockets of the vaults of this substructure which led to the wavy surface of the mosaic floor. An opportunity was given me in August last (when portions of the pavement in south transept had been taken up to restore the vaults) to trace out the lines of the arches crossing the church and of the foundation walls of the original basilica church. The west end of the new crypt, therefore, is the same as that of the old one; how far it extended to the east is still a matter of conjecture, but as Cattaneo himself allows, the length of a chancel, including the apse, usually varies between one-third and two-fifths of that of the central nave, and as that is the actual proportion of the existing chancel, there is fair reason to suppose that the inside walls of the three apses are in the same position as that occupied by the original church.

In the reconstruction of the new church, therefore, there were certain restrictions, firstly, in the width of nave and aisles, the old walls being retained, and, secondly, in a limitation in the projection of north and south transepts, as the south wall of St. Theodore and the inner wall of the ducal palace were utilised. These limitations have apparently led to a diminution in the diameter of the domes on the north and south transepts, which are 33 feet, as against 42 feet, the diameter of the nave dome, and a similar diminution in the choir dome, so as not to interfere with the central apse. The central dome is egg-shaped, being 42 feet from north and south, and only 41 feet from east to west.

Now Contarini died in 1070, and his successor, Domenico Selvo, is said to have commenced the embellishment. It follows that the main structure must have been completed, including the atrium, by that date, and Cattaneo is of opinion that owing to the immense resources they had the task was a possible one; but the structure thus completed bore a very different aspect to the St. Mark's we now see. Externally it was a plain brick building, like the present south transept, its decoration being confined to the brick arches, which, with their deep voussoirs, have a certain decorative character—to small niches with marble shafts and capitals, to roundels, corbel tables, and string courses. I have endeavoured to make a drawing reproducing the original façade, my conception being based, first, on the walls of the existing structure; secondly, on the reproduction given in Ongania's work of those portions of the ancient structure which were exposed and copied by Mr. Scott during the restoration; and, thirdly, on Cattaneo's description. A tracing from this is given in Ill. 58. In front of the atrium were five rectangular niches and two small ones, one on each side of the central niche. The extrados of the arches spanning these niches was exposed and covered with lead, as those of St. Saviour at Constantinople. The piers supporting them were decorated with semicircular niches, with small marble capitals and brick shafts, and roundels and blind niches above. The gables of the upper storey, like those of the transepts, were also semicircular, but at a lower level than those of the existing transept (about 2 feet 6 inches). This accounts for the indented brick circular string course which exists in the south transept, and which originally ran round the coping, now raised the same dimension. The existing dome terminals are in timber, covered with lead; they were added in the thirteenth century, so that originally the domes were much lower, and the extrados of the arches of the windows were probably exposed, as they are in all Greek churches. I could find no evidence of this, as all the windows have jambs, some of late date, possibly thirteenth century; also the upright portions of the drum have been refaced, and the drums raised. As regards the interior, it is certain that many of the capitals, columns, balustrades, jambs, and lintels were taken from older



58.—RESTORATION OF THE OLD FRONT OF ST. MARK'S AT THE CLOSE OF THE ELEVENTH CENTURY.



structures, and that the original church and that of St. Theodore furnished at least a portion. Examples of all periods are found in the present church, including Roman capitals and those of the fifth century onwards. The decoration of the exterior took two centuries to carry out, not including the fourteenth-century florid work of the upper gallery and pinnacles, and every vessel which set out for the East was required to bring back columns, capitals, and marbles of all kinds to enrich the great church, which, in this respect alone, is absolutely unique. There is no example in the East which suggests a precedent for the singular decoration of the exterior of the atrium with rows of columns in two tiers, and the only parallel instances I am acquainted with are those of the churches of St. Gilles and of St. Trophime at Arles, of the twelfth century, where columns carrying architraves are set close together with figures between, and here the idea was certainly taken from the *Maison Carrée* at Nîmes, except that they borrowed the idea of a peristyle for the purposes of a wall decoration. To go through the various portions of the cathedral would be beyond the limits of my paper, and would require two or three evenings instead of one. In 1150 the galleries were reduced in width to give increased light to the aisles and chapels. The great arch outside the chapel of St. Isidore was erected in the thirteenth century. The baptistery was decorated with marbles and mosaics in the fifteenth century, but the columns, capitals, with dossier and vault date from the early structure. The chapel of St. Zeno was originally the entrance to the atrium from the south porch, there being also an entrance in the north porch, known as the Flower Porch (*Porta delle Fiori*). The vault of the nave and aisles extends over the west atrium. On the south side two bays project, viz., over the south porch and the entrance to baptistery, and these formed, according to Cattaneo, open loggias; in the former is a semi-spherical vault intended, doubtless, to be decorated with mosaic. It is an interesting example of brick domical construction of the period. On the north atrium are four chambers all vaulted with domes. All these formed part of the church erected by Contarini between 1063 and 1070.

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It now remains for me to call your attention to some of the principal decorative sculpture which enriches St. Mark's. Broadly speaking, this may be divided into two classes: first, that which was built-in, either decoratively, or in order to preserve artistic treasures imported from the East; and secondly, those which have been utilised and form a structural part of the building.

In both cases my description is necessarily limited to those features of which I happen to possess photographs. Of the first class, the greater number are found in the south side of the church. Built into the south wall of the treasury are several plaques of marble, of three of which I have photographs; they are all of Greek origin and imported. Two represent the tree of life with their two guardians; in one case, peacocks pecking at the fruit; in the other, winged griffins: the tree springing out of vases in both cases. The third slab represents that peculiar interlaced work which was afterwards elaborated by the Saracens; the design and execution is similar to the balustrades in Sta. Sophia, and belongs to the eighth century. The group of four figures of knights in red porphyry at the angle of the treasury was brought from Acre in Syria, and is attributed to the tenth or eleventh century. The two piers which stand out in front of the south side are the door-posts of the church of St. Saba in Ptolemais; they are supposed to be seventh century work, and were brought to Venice in 1251. They ought to change places in order to occupy the relative position they formerly held in the church. The reveals of the door face outwards instead of inwards and towards one another. Built in the wall of north transept is another slab of tenth or eleventh century work, and on the north wall of atrium, another richly carved slab of the eleventh century. Outside the chapel of the Madonna of the Mascoli is a bas-relief of Victory, with cornucopia in one hand and a wreath in the other, of the tenth century.

The bronze horses which surmount the chief portals of St. Mark's have had a chequered existence. They are supposed to have been brought from Alexandria by Augustus\* after his

\* It is now considered probable that these bronze horses were erected in the time of Augustus over a propylon or gateway at Corinth, of which the remains

victory over Mark Antony, and placed over his triumphal arch in Rome; they were, it is believed, attached to a chariot, and after successively surmounting the arches of Nero, Domitian, Trajan and Constantine, were taken away by the latter to Constantinople, and placed in the Hippodrome. In the fourth crusade of 1204, they fell to the share of the Venetians, under Doge Dandolo, who transferred them to Venice, where they remained till 1797, when Napoleon brought them over to Paris to place over the Arc de Carrousel in the Tuileries, and in 1815 they were brought back to Venice.

There still remain among the non-structural features, four capitals which, with their columns, stand in the atrium. They evidently arrived too late to be embodied in the construction, and, therefore, I imagine that they may have formed part of the spoil brought over by Doge Dandolo. They are of such fine design and execution as to have been executed in the best period of Byzantine architecture, and, therefore, I attribute them to the sixth century.

On the north and south fronts there is a large number of rectangular panels of the same size as the Victory already referred to, with figures of various saints, others of smaller size, and of circular medallions; and on the treasury wall are other decorative plaques with geometrical and flying ornaments.

I must now pass on to the structural features—the capitals and balustrades. As there are about 520 of the former, large and small, all Byzantine or copied from Byzantine examples, and this does not include the Venetian Gothic capitals of the canopied pinnacles, I can only make a selection, and confine my description to those of which I possess photographs, which constitute the more interesting specimens.

There are three examples inside the church which Cattaneo claims as Roman; they may antedate the transfer of the Empire to Byzantium, but they were certainly carved by Greek

have been discovered by the American Archæological Society. On a mirror case found at Corinth is shown a medallion with triumphal archway and a head of Nero on the reverse. The four horses shown above the archway on this medallion resemble those at Venice, and there is a half legendary account which states that the quadriga formerly in the Hippodrome at Constantinople came from some building at Corinth and was the work of Lysippus, a well-known Greek sculptor.

artists. The leaves all have that indented form which is characteristic of the Greek treatment of the acanthus, in contradistinction to the flat section of the Roman leaf.

Of the Byzantine-Corinthian, the finest examples are those in the nave—two Greek transcripts of the Corinthian with angle volutes and form, in which rams take the place of the leaves



59.—CAPITAL IN NAVE, ST. MARK'S, VENICE.

on the diagonal and the volutes (one of these is reproduced in Ill. 59). As they are all of the finest Byzantine work, and must have been incorporated in Contarini's church shortly after its commencement, I consider that they were originally in Participazio's church, and were among the spoils he brought from Sicily. They are remarkable for their bold treatment, and the rendering of the spiky leaves of the *Acanthus spinosa* (see, e.g., Ills. 59 and 60).



The small volute of the Corinthian capital does not have seemed to have met with much favour at the hands of the Byzantine artist. He preferred the Composite, possibly because the larger volute of that order (which as you know was a mixture of the Corinthian and the Ionic capital) gave better support to the



69.—CAPITAL IN NAVE, ST. MARK'S, VENICE.

abacus, an important consideration with the Byzantine artist, as the dimensions of the wall above were much greater than the diameter of column. He so improved upon the Roman example, however, that he made it an original feature. In some of them there is a sort of attempt to copy the egg-and-tongue moulding which forms the line of separation of the Ionic and Corinthian capitals, but eventually they gave this up, and introduced a cresting of leaves leaning forward, which makes a

much happier junction, and by its difference in treatment, gives a pleasing variety (Ill. 61). These capitals on the east side of the transepts are remarkable examples of original treatment with a vigour of design and a crispness in the carving which is quite delightful.

I come next to the Byzantine-Ionic, and this reminds me that I have not called your attention to the change which seems to have taken place in what is called the "dosseret" in Byzantine examples. This was a super-capital designed to carry the base of the arch, which in diameter exceeded that of the column. I think it possible that when the capitals were imported they left the dossier behind them;\* sometimes they were not carved at all, or only with a cross. A larger seat was required, however, for the base of the arches, and, therefore, they introduced the abacus, which is simply a moulded dossier, square, and of much less height than the Byzantine example. I think it inferior to the dossier, and the Corinthian examples of the nave will, I think, support my view. They have no connection with the capital and do not lead up to it.

Now, with the Ionic capital it was different, it was so small and of such slight height, comparatively, that they made it part of the dossier. There are four examples of it in the atrium, which were certainly imported from the East, and in one of them the undercut leaf work in the middle having been broken in transit, they have carved a cross in its place.

In Sta. Sophia, in Constantinople, they adopted quite a new and original treatment. They employed the moulded abacus with an Ionic capital with small volutes (the volutes of the Composite capital curves out at the angles and is the same on all four sides, whereas the true Ionic capital has cushions on two sides), and instead of the bell-shaped form they adopted what we call the cushion capital, except that all its horizontal sections are circular on plan. On this surface on the sides of the capital they carved a series of flowing stems, with leaves like the acacia plant; at the angles of the capital they carved

\* It should be noted, however, that the dossier was not in favour at Constantinople in Justinian's time, though found in work previous to his reign. It has, however, led to the curtailing of the volutes which, though still suggesting the support of the angles of the abacus, have been greatly reduced in size.



61.—CAPITALS IN TRANSEPT, ST. MARK'S.







62.—CAPITALS IN CHOIR, ST. MARK'S, VENICE.

the acanthus leaf, and in the middle of the chief face they left a projecting boss with geometrical ornament much undercut. The acacia leaf decoration is largely found in Byzantium and Greece, and in examples from Dalmatia, Istria and various Italian towns of the north.

The finest examples with slightly different treatment of the leaves, with the moulded abacus, the Ionic volute and the projecting boss, are found in the choir of St. Mark (Ill. 62).<sup>\*</sup> They were probably carved for the place they occupy, but by Greek artists.

The next specimens are those with birds and beasts at the angles, the eagle with outstretched wings or the ram, occupying the position of the volutes and the diagonal leaves as in Ill. 59. In some cases the lower part is covered with leaf work, in others with a basket pattern, and the earliest example of the latter is found in the church of SS. Sergius and Bacchus, Constantinople, built by Justinian, just before Sta. Sophia, 535—537 A.D.

In the same church will be found examples of another original type of capital, which it is rather difficult to describe (Ill. 50 B). It consists of a series of eight convex gores, with conventional interlaced patterns on each, out of which on each side spring three rows of leaves with three pointed lobes to each. Sometimes the conventional pattern is replaced by a single leaf with numerous lobes on each side. These all have, instead of the egg-and-tongue round the base, a zigzag or wave pattern running round. All these capitals are much undercut, and there is a great variety of them. A fine example of this capital was used in the triforium galleries of San Vitale (Ill. 50 B) at Ravenna, built about the time of St. Sergius, Constantinople, and on the same plan; they were certainly carved by Greek artists.

On the lower storey of San Vitale there is another type of capital, very poorly carved when compared with the magnificent examples which flank the west front of St. Mark. These latter are, unfortunately, much damaged owing to their exposed

<sup>\*</sup> In some of the late examples in Constantinople, the Ionic volute is omitted, and the dossier becomes the capital: this is often the case in the narthex, where the vaulting was comparatively low.

position and to the deep undercutting. However, the example of this capital at San Vitale shows the principle. It is one of the favourite forms adopted by the Greeks of carving a cubical block from the square of the abacus to the circular meeting of the capital. On the four sides of the upper portion round the



63.—THE THISTLE CAPITAL, ST. MARK'S.

circular base and at each angle they carved a round band of interlaced work, deeply undercut, and in the centre of each base a feature partly conventional and partly natural, the original model of which might possibly be found in those of the Greek steles or the antefixæ of their temple roofs (Ill. 63 A). These two examples from Venice and Ravenna show clearly the difference between the work of a first class artist and a second or third rate one. These angle capitals are probably of Greek



origin. There is a small variation of them on the north front without the upper band. There are two or three other varieties of less importance, one known as the thistle capital (Ill. 63), with what may be a pine at the angle, which is of the same



64.—CAPITAL IN NARTHEX, ST. MARK'S, VENICE.

design as the capitals of the Iconostasis of St. Luke's Monastery, near Delphi, of the tenth century.\*

Inside the cathedral, and crowning the responds against the walls in nave and transept, are some very remarkable capitals; Byzantine-Ionic, but with dossieret, square die above, and abacus, all incised with conventional and floral patterns, inlaid with black cement.

\* There is a third example in the mosque at Kairwan in Barbary, and a fourth in the kibleh of Ibn-Tooloon, Cairo.

Inside the west atrium are four capitals, Byzantine-Ionic, with cornucopia or ancient Roman decorations carved on the dossier. I think, however, all these capitals are copies by Byzanto-Lombardic artists, because they have taken liberties with the volute which no Greek artist would have tolerated,\* as, for instance, in Ill. 64.

The last type which I will mention is that of the capitals which flank the chief portal, and to which, therefore, the architect or sculptor attached some importance. They are those capitals in which the leaves are carved as if blown by the wind, and they are enthusiastically described by Ruskin. Of these I am able to show you the prototype (Ill. 65) in the photograph of a capital from the church of Sta. Sophia, Thessalonica, built during the latter years of Justinian's reign. The examples at St. Mark's lose by comparison, but I am of opinion that they were imported from the East, where they occupied a different position, or they would have been more carefully carved on the sides where they are most seen.

Among the most interesting features in St. Mark's are the parapets or balustrades of the galleries which reign round the interior. Two of these are shown in Ill. 52. There are from seventy to eighty of these, of various designs, some of them brought from the East, but the greater number carved for their position, though copied from Greek models. These parapets are upright slabs of marble, 2 to 3 feet high, and from 3 to 8 feet long. The ground is sunk, leaving the design in relief. They are fitted in grooves worked in marble posts, a Greek and Roman method of forming enclosures, and found in the parapets of Byzantine churches and in the enclosures of their choirs. The choir of St. Clemente, at Rome (Ill. 52), is enclosed with panels and posts, the latter richly carved, many of which were discovered in the more ancient church over which the existing basilica was built. I have no photograph of these, but two or three drawings which will give the type of some, and these are contrasted with others at Constantinople, which show the origin of their design.

Of the jambs and lintels of doorways there are many

\* They have turned the volute upside down, but Dr. Freshfield's photographs prove that this was also done in Constantinople.



65.—CAPITAL FROM STA. SOPHIA, THESSALONICA.







67.—PART OF EAST END OF CHURCH, MURANO, NEAR VENICE,  
AND DETAILS.

examples of early period, and four or six of these are traced as belonging to Participazio's church of the ninth century, used up again (Ill. 52).

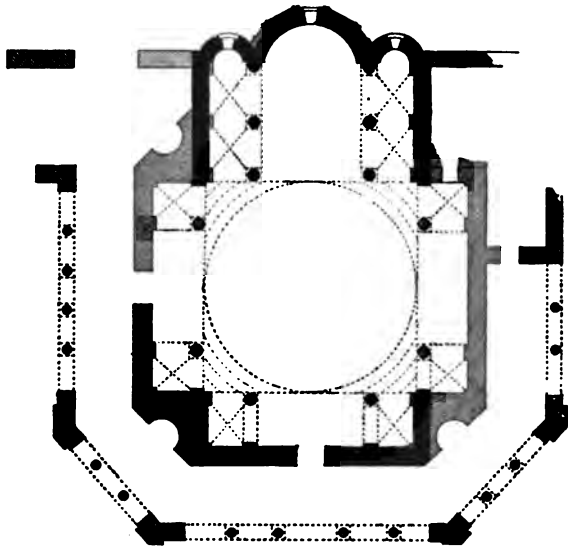
The last decorative feature to which I will direct your attention is the favourite string course with acanthus leaves, portions of which are turned over so as to catch the light, and break the too horizontal line of the top moulding. The same design (Ill. 55) is put in the Kahriyeh Djami church at Constantinople, and the Iconostasis of the Panagia church of St. Luke, near Delphi. Many lengths of it were carved for Participazio's church, and variations are found faithfully copied for two centuries and more.

Mr. Jackson's work on Dalmatia and Istria will show you how great an influence was exercised in Venice by the Byzantine churches in those countries, a debt which was repaid afterwards when in succeeding centuries they were ruled by Venice. If I have not mentioned Dalmatia and Istria specifically before, it is because I have included them generally with Eastern countries. But as to the influence of St. Mark's, so enamoured were the Venetian artists with Byzantine work, that down to the Renaissance period they frequently copied it with such accuracy as to deceive all but experts, and many of the wells reported to be eleventh or twelfth century work, are, according to Cattaneo, reproductions of the fourteenth and fifteenth centuries. There is a favourite string course with leaves turned over, the design of which comes originally from the church of Monas-tes-Koras, Constantinople (see Ill. 55) and is found throughout St. Mark's, in St. Donato, Murano (Ill. 57), in the early palaces of the Grand Canal, and which I came across in a palace at Ancona. I have no doubt it could be found elsewhere, thus testifying to the general favour with which it met in the cities of North Italy.

In Ill. 67 is shown the feature known as the Venetian dentil, which is of Byzantine origin, and found in Sta. Sophia. It is a corruption of the ordinary dentil course; but firstly, the space between the dentils is made equal to the dentil and is sloped off, of which the earliest example is found in the porch of the church of St. John Studius, Constantinople; and secondly, it is reversed, dentil and space between alternating.

Thus modified, it is employed as a border to panels and slabs of marble; and here in Murano runs round the circular-headed panel decorated with the Byzantine Tree of Life.

The cathedral of Torcello, an island about eight miles to the north of Venice, was founded in the seventh century, and although reconstructed since, still possesses some of the Byzantine capitals which were used up in the first church. Of this church the central apse and fragments of the baptistery



66.—PLAN OF SANTA FOSCA, TORCELLO.

still exist. In 864 the external walls would seem to have been rebuilt, and two minor apses added, one on each side of the central apse. A crypt was then formed under the latter, the floor of the apse raised, and the range of marble seats and the bishop's throne erected. To this period also belongs the rich interlaced work of the west doorway. In 1008, when the son of Doge Orseolio became Bishop of Torcello, the nave arcade was rebuilt, and thirteen of the eighteen capitals date from this period, as also the marble enclosure to the choir, the panels of which are Byzantine in treatment, if not actually carved by Greek artists.



By the side of the cathedral is the church of St. Fosca, originally a basilican church of the ninth century, but modified and partly rebuilt in 1008. (The plan is given in Ill. 66.) There is a special interest attached to the changes which then took place, because they may possibly have suggested the rebuilding of St. Mark's on a Byzantine plan. The model, however, on which it is based is one of the later type of Greek churches, in which the central dome is carried on detached columns. They had, however, a very vague idea how to build pendentives, and still less conception of what the thrust of a dome was likely to be, and I should doubt if it was ever attempted. By throwing small arches across the angles they managed to arrive at the circular base for the dome, and then probably left off, the church now being covered with a timber roof, the exterior of which has the appearance of being the original covering. The capitals of the interior are fine examples of Byzantine Corinthian. Those of the octagonal arcade are barbarous attempts to invent new forms with Byzantine ornament.

The central apse, which was rebuilt in 1008, is polygonal externally, which shows its Byzantine origin. Underneath the cornice we find the earliest example of these triangular panels, which were afterwards adopted in the church of St. Donato, in the island of Murano, two miles from Venice, with this exception, that in St. Fosca the triangular recesses are filled with decorations in stucco, whilst at Murano, being much closer to the eye, they are filled with marble incised panels (see Ill. 67). There is no doubt that these panels, which are only incised and of simple execution, were produced to fit the panels, and not the converse, as is suggested by Fergusson. The church at Murano was built towards the close of the eleventh or beginning of the twelfth century, and possesses many fragments of interlaced pattern slabs of the eighth and ninth centuries. The two large slabs which stand between the upper arcade at each end of the west part bear so great a resemblance to the panels of the choir at Torcélo that they may have been carved by the same Greek artists. The apse of Murano is also polygonal.

The position of Ancona opposite the Dalmatian coast, and its facilities of communication with Venice by sea, would naturally bring it within the sphere of Byzantine influence. I

have been quite unable to get any information as to the history of the churches here, so that it is difficult to decide their dates. The three churches of interest, so far as my subject is concerned, are the Duomo, dedicated to St. Ciriaco, Sta. Maria-in-Piazza, and Sta. Maria Misericordia. The latter is a square church on the plan of a Greek cross with dome in centre carried on four piers. There is no Byzantine detail except a pulpit of the eighth century; evidently carved by native artists who attempted to copy Byzantine work.

Sta. Maria-in-Piazza possesses an extremely rich west façade, with an unusual screen of arches one above the other, carried by small shafts. The wall behind these has been panelled with marble slabs carved with interlacing Byzantine ornament, which comes irregularly behind the shafts. I came to the conclusion on the spot that in imitation of St. Mark's at Venice the architect of the first church inlaid the upper portion of his façade with marble slabs from some more ancient building. At a subsequent date, finding that they were being outdone by St. Mark's, and being unable to command the supply of marble columns and capitals enjoyed by the Venetian Republic, they employed a Lombardic artist to decorate the front in his own way, and we have in this remarkable decoration the result of his efforts. The Byzantine leaf cornice is found both inside and outside of the church, which I should assign to the end of the eleventh century or beginning of the twelfth, and the arcading fifty to seventy years later. Subsequent additions have much altered the upper part of the façade, and the aisles have been raised and partially rebuilt.

The duomo or cathedral is variously ascribed to the tenth or eleventh century, but it contains Byzantine capitals and other treasures of much earlier date. I should ascribe it to the end of the eleventh century, and the plan seems to me to have been taken from St. Mark's at Venice. It is in the form of a Greek cross (not including the extension of choir at a later date), and it consists of nave, transepts, and choir, all with side aisles, and a central ribbed dome of twelve sides, carried on a drum and pendentives of the twelfth century. The nave, transepts, and choir are all covered with timber roofs, and there are crypts under both transepts and choir. The capitals are all Byzantine,

with dosserets, and in the balustrade of the parapet to south transept there are eight marble slabs with incised work, originally, I think, inlaid with mosaic, four of which must, I think, be of Greek workmanship, as they are carved with birds and animals which have their prototypes in Greece. The inscriptions, however, on other examples stored in the crypt are in Latin, as also those on the figures or face of the slabs or parapet to south transept and others encased in the façade rebuilt in the thirteenth century. The inlaid ground of those in the transept had all been taken out, but in the crypt one of the slabs still retains its cement inlay, with three or four pieces of glass, which suggested that they were tesserae from which the gold surface had been chipped off. I have tried in various ways to obtain more information respecting these slabs, but in vain, and as I unfortunately arrived in Ancona two days before some *fête*, and before I left the whole church was enveloped in red drapery and the windows covered with veils, I was unable to copy any of the inscriptions.

Owing to the paucity of examples in Lombardy prior to the eleventh century, we are unable to trace the earlier developments of what is termed the *Italo-Byzantine* style to distinguish it from the *Romano-Byzantine* and the *Lombardo-Byzantine* phases. The few churches which remain, and to which I have already referred, of the ninth and tenth centuries, still retain the simple basilica form with timber roofs. Early in the eleventh century, however, a new and important element is introduced in the desire to erect churches, the construction of which should be fire-proof, in other words, to vault the nave and aisles of their churches. This had for centuries been done in the East: in fact, after the erection of Sta. Sophia, all the churches were vaulted. De Dartein does not recognise any Eastern influence in this respect; at the same time, he is bound to allow that it may have inclined the architects of the West to make an attempt in the same way. The domical form given to the webs of all the Italian examples is so marked, and is so widely different from the early Roman vaulting, which at that time still remained throughout the country, that it is only fair to suppose that the early Italian builders may have profited by the lesson set them in the East. Be that as it may, it is quite

certain that with the introduction of vaulted naves, an altogether different plan of pier or support was required in the place of the ordinary basilican column, and the favourite Byzantine Composite or Corinthian cap could not be used up again. They were obliged, therefore, to invent and carve a new combination of capital which should meet the requirements of the compound or cluster pier.

The dosseret was given up, or rather its place was taken by an abacus of less height, decorated with interlaced work or scrolls, or leaf ornament of various kinds. It had no longer the same great projection, for here we return again to the old Roman system, in which the arch or architrave or wall above is in the same plane as the pier or shaft below the capital.

In the Byzantine capital animals or birds are rarely carved; the eagle, the lion, the lamb, and the ram's head occasionally take the place of the volute, and support the angles of the abacus, but are probably not found in more examples than from 3 to 5 per cent. In the Italo-Byzantine capital it is almost the reverse. Animals, and monsters, and figures of all kinds decorate their capitals, relieved with interlaced work of various patterns. Though bold and vigorous, the carving of these animals is very barbaric, and it is only when they reproduce those animals or bird forms which occur occasionally in Byzantine capitals that the treatment is properly conventionalised and good. In fact, the finest capitals of the eleventh and twelfth centuries are those in which the artists have felt the influence of Eastern work and tried to reproduce it.

In the church of St. Michele, at Pavia, carved work of three periods may be traced: 1st, the early Lombardic work of the eighth or ninth century, animals of barbaric type taken from an earlier building and built into the eleventh century façade; 2nd, Lombardo-Byzantine panels, which are utilised in the jambs of the portals; and, 3rd, the mingling of these two elements in the carved work specially executed for the church. The same is observable in the church of St. Ambrogio at Milan, where the jambs and archmoulds of the west doorway would seem to have been taken from the earlier ninth century church. Some of the carving in this church seems to be of earlier date than St. Michele, but I am inclined to think that is due to the

existence of much Roman work in the town. In St. Eustorgio and St. Celso, also in Milan; in St. Pietro-in-Cielo-d'Oro, Pavia; St. Pietro and Paolo, Bologna; St. Savino, Piacenza; the cathedral of Parma, and other churches of the twelfth century, we find a magnificent series of capitals, showing a wonderful fertility of design, and, as time progressed, of knowledge and finish of execution. One of these churches, St. Pietro-in-Cielo-d'Oro, is dated 1132, and in allowing fifty years earlier for the first developments of the style in St. Ambrogio, Milan, and St. Michele, Pavia, and, perhaps, twenty to thirty years later for St. Celso at Milan, we should probably not be far wrong, though some authorities, among them M. de Dartein, are inclined to give a much earlier period. Towards the close of the twelfth century the Byzantine influence dies out, and in the baptistery of Parma there is scarcely any trace; the concave sections given to the leaves and tendrils are replaced by convex, and interlaced work is seldom employed.

The Byzantine influence in Venice, Padua, Vicenza, and Verona lasted a much longer period. The church of St. Antonio, at Padua, built between 1232 and 1307, is the most notable example, but only in the plan and the main features of the building in which they have attempted to reproduce a new version of St. Mark's. It is in the form of a Latin cross, and is crowned with eight domes.

Along the Grand Canal in Venice are the remains of seven or eight Byzantine palaces of the eleventh, twelfth, and thirteenth centuries. The most remarkable of these is the Fondaco dei Turchi, a building which has lately been entirely restored, I might say rebuilt, none of the ancient marbles being retained. I fortunately purchased on my first visit to Venice two photographs of the building in its original decayed condition, but of which there remained sufficient sound material to have been embodied in the restoration. The Venetians, however, wanted to have a new building, and allowed their architect to exercise his ingenuity in the design of an upper storey or series of gables, which I am sure never existed in the old building. In the Casa Loredan, Casa Farsetti, and other palaces, we find the original arcade of fenestration which formed the foundation of what is known as the Venetian Gothic style, such as is found in the

Ca d'Oro, the Foscari, and other palaces. The arches of these Byzantine palaces are all stilted, and in their hood moulds they employ always what is known as the Venetian dentil (Ill. 67), but which is first found in Sta. Sophia at Constantinople. This dentil is found in all the Venetian palaces down to the end of the fifteenth century, and also at Padua, Vicenza, and Verona. All the capitals which carry these arches are of Byzantine character, doubtless copied by the Venetian artist from those of the models in St. Mark's, and the leaf cornice to which I have directed your attention reigns throughout.

The Byzantine influence in Lombardy, I have said, dies out towards the end of the twelfth century. This, however, is not the case in Venice and in the towns which came within her influence.

I can only express the hope, in conclusion, that I have been able to lay before you clearly, 1st, the essential characteristics of the Byzantine style; 2nd, the sources through which the influence of that style penetrated into Italy, and 3rd, the principal results of that influence. If, beyond these three objects, I have been able to awaken your interest in the high decorative qualities of the Byzantine style, in the variety and beauty of its carved capitals and screens, and last, but not least, in the reticence and simplicity of its masses, I shall not altogether have failed in the object of my paper, although I have not gone to the headquarters of the style. For our immediate purpose as revivalists of principle in architectural design, the unconscious adaptation by a nation of a foreign style may possibly teach us lessons which the study of the originals would at first fail to impart to us.

# SAINT-FRONT OF PÉRIGUEUX, AND THE DOMED CHURCHES OF PÉRIGORD AND LA CHARENTE.

A PAPER

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## SUMMARY.

M. DE VERNEILH'S THEORIES RELATING TO THE FIVE-DOMED CHURCH OF SAINT-FRONT, PÉRIGUEUX, AND ITS PROTOTYPE, ST. MARK'S, VENICE, AS PUBLISHED IN HIS WORK, *L'ARCHITECTURE BYZANTINE EN FRANCE*—COMPARISON OF THE DESIGN AND CONSTRUCTION OF THE TWO CHURCHES—ANALYSIS OF THE REMAINS OF THE SO-CALLED LATIN CHURCH, ATTRIBUTED BY DE VERNEILH TO THE SIXTH CENTURY, AND COMPARISON OF ITS REMAINS WITH OTHER CHURCHES OF THE ELEVENTH CENTURY TO PROVE THAT IT WAS THE CHURCH CONSECRATED IN 1047 A.D.—HISTORICAL RECORDS OF THE DESTRUCTION BY FIRE OF A CHURCH OF SAINT-FRONT IN 1120 A.D.—DESCRIPTION OF THE FIVE-DOMED CHURCH AND COMPARISON OF ITS CONSTRUCTION WITH THAT OF ST. STEPHEN'S, PÉRIGUEUX, AND OTHER DOMED CHURCHES IN PÉRIGORD AND LA CHARENTE—SIMILARITY OF THE DECORATIVE SCULPTURE OF SAINT-FRONT TO THAT FOUND IN OTHER CHURCHES IN THE SOUTH OF FRANCE, WHICH IS PURE ROMANESQUE OF THE TWELFTH CENTURY, SHOWING THE INFLUENCE OF ROMAN WORK AND THE ABSENCE OF ANY BYZANTINE CHARACTERISTICS—THE MARKED DIFFERENCE IN THE CONSTRUCTION OF THE DOMES AND PENDENTIVES OF PÉRIGORD AND OF THOSE IN THE EAST—REFERENCES TO THE EARLIER EXAMPLES OF DOMES IN FRANCE FROM THE NINTH TO THE TENTH CENTURY, AND COMPARISON OF THEIR EXECUTION WITH THAT OF SAINT-FRONT, SHOWING THE GREAT ADVANCE MADE IN THE CONSTRUCTION OF THE LATTER AND HENCE ITS LATE DATE—CONJECTURED RESTORATION OF THE PLAN OF THE SO-CALLED LATIN CHURCH, SUGGESTING THE POSITION OF THE ORIGINAL BELL TOWER, DESTROYED BY FIRE IN 1120 A.D.—GENERAL CONCLUSIONS AS TO THE DATE OF THE FIVE-DOMED CHURCH.





## SAINT-FRONT AT PÉRIGUEUX.

IN 1851 Félix de Verneilh, a well-known antiquary of Périgueux, published a work entitled *L'Architecture Byzantine en France*, being a description of the church of Saint-Front at Périgueux, and of the domed churches of Aquitaine. The work was well illustrated with plans, sections, views, and details, all drawn and engraved by Léon Gaucherel, a well-known artist of the period, who had been recommended by Viollet-le-Duc, and who executed his commission with all that artistic power and beauty of line which characterises the architectural publications of our French *confrères*.

De Verneilh explains in his preface that Gaucherel was not an architect, and himself still less so; nevertheless, between them, they undertook an architect's work in measuring and delineating the edifice, and he trusts that any shortcomings in the work may be put down to excess of zeal. Beautiful as the drawings are, they are not without their faults, and, as might have been expected, in some cases de Verneilh entirely fails to grasp the constructional peculiarities of the most important feature, viz., the pendentives of the domes, and he attaches importance to others which are either of no account or are inaccurately represented.\* Notwithstanding these shortcomings, the quarto volume published in 1851 is still the only

\* I allude here more particularly to what he calls "long-and-short" work, having a vague idea that early Saxon buildings in England are distinguished by that construction; but the alternate high and low courses as shown in the casing of the central piers never existed. The courses varied in height just as the stones from the quarry came to the mason's hand, and when they were taken down during the restoration, the eight or ten narrow courses (not alternating as shown in his drawing) of the whole pier bonded no farther into the old work than the others. An etching by Jules de Verneilh (brother of Félix de Verneilh), published in the *Antiquities of Périgueux*, probably shows the real construction. Curiously enough, de Verneilh publishes this same drawing in Didron's *Annales archéologiques*, Vol. XIV., apparently forgetting the fact that in his book alternate courses are shown.

standard work on the subject, and, with the exception of three plates drawn for Gailhabaud by Viollet-le-Duc in 1853, and one or two drawings in the Rev. J. L. Petit's work, entitled *Architectural Studies in France*, and published in 1854, no attempt has been made either to produce fresh illustrations, or even to analyse the structure, notwithstanding the immense strides made in archæological research during the last forty years. Three years ago, when occupied with the new edition of Fergusson's *History of Architecture*, I had to work up the subject, and I took the opportunity afforded me by the visit of one of my students, Mr. Bolton, to Périgueux, to obtain some information relative to the construction of the church; the valuable notes, however, which he was kind enough to obtain for me were not sufficient; so that I determined last year to pay a second visit to the town. It is the result of that visit which I propose to lay before you this evening.

I ought, perhaps, to preface my description by saying that the principal objects of de Verneilh's book were, firstly, to prove that the church of Saint-Front (and to prevent any misunderstanding I shall in future call it the five-domed church, to distinguish it from the old church of Saint-Front) was founded about 984, and was built in imitation of St. Mark's at Venice; and, secondly, that the five-domed church of Saint-Front was the model from which all the domed churches in Aquitaine were copied.

As St. Mark's was built in imitation of the church of the Holy Apostles in Constantinople, it had a distinctly Byzantine origin in the employment of domes. The five-domed church of Saint-Front was therefore looked upon as exhibiting a Byzantine character, and all the churches which are assumed to have taken it as their model, so far as the employment of the dome is concerned, are classed as Byzantine.

St. Froterius, Bishop of Périgueux, is recorded to have been buried in Saint-Front in 991. De Verneilh assumes, therefore, that the church may have been founded about 984. Bishop Martinus, who followed, died in the year 1000, and he and Raoul de Couhé, who succeeded him and died in 1013, were also buried in the church, the latter, according to the records,

having directed the building of the church for twelve years. Lastly, the church was dedicated in 1047.

The dates given by de Verneilh for St. Mark's at Venice are 977 for the foundation of the church by Orseolo, Doge of Venice, and 1071 for its completion under Domenico Contarini and Domenico Selvo. In order partly to account for this singular introduction of a foreign style, de Verneilh draws attention to the fact that a Venetian colony of merchants settled in Limoges in the latter part of the tenth century, and he suggests that they may have contributed in some sense to the immigration of Venetian artists.

Within the last few years, however, the restoration of the church of St. Mark, and the temporary stripping of its marble facing in order to restore the brick core, revealed the fact that portions of the walls were of more ancient date than Orseolo's time. This caused a more diligent search among the archives of Venice, which resulted in the discovery that Orseolo's work was confined to the restoration of the old basilica, which had been partially destroyed by fire, and that the five domes which now form its chief characteristic were not erected till about 1063, under Domenico Contarini, who used up in the new structure many of the new capitals and columns provided by Orseolo in his restoration of the old basilica. The record also states that the new five-domed church was erected in imitation of the church of the Holy Apostles at Constantinople. This church was pulled down, in 1464, by Mahomet II., to provide a site for his mosque, so that we have only the description of the church by Procopius to go by.

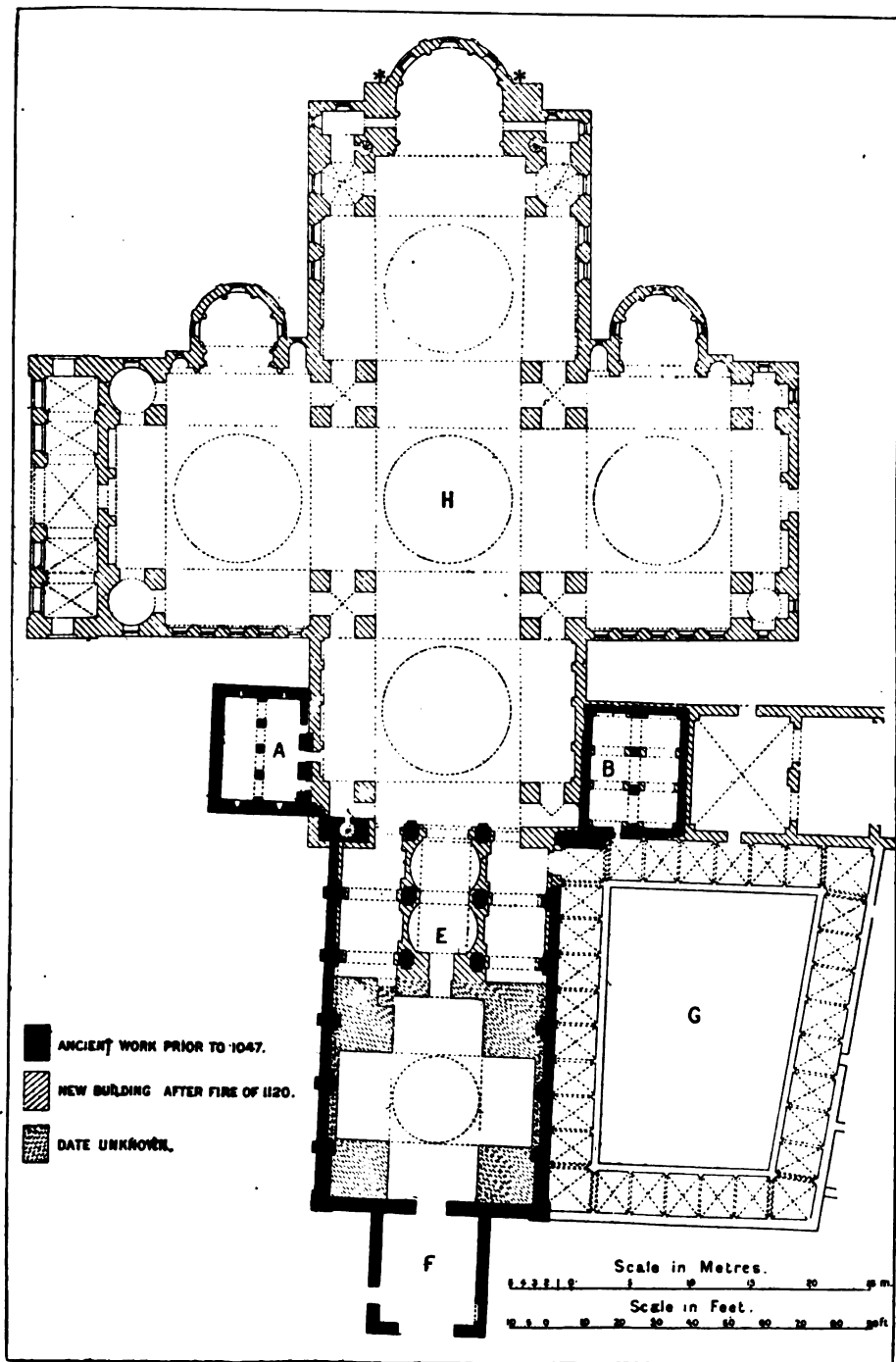
Now, it is evident that if the five-domed church of St. Mark was not erected till 1063, either Saint-Front could not have been copied from it, or a later date must be ascribed to the latter for its erection. But de Verneilh's arguments as to the one being a copy of the other are, to my mind, conclusive, so far as the plan and general design are concerned, and, as will be understood, this opinion was strengthened by other considerations, to which I shall draw your attention later on. It has been suggested that the church of the Holy Apostles at Constantinople might have been the model on which Saint-Front was based, but there is absolutely no evidence to support

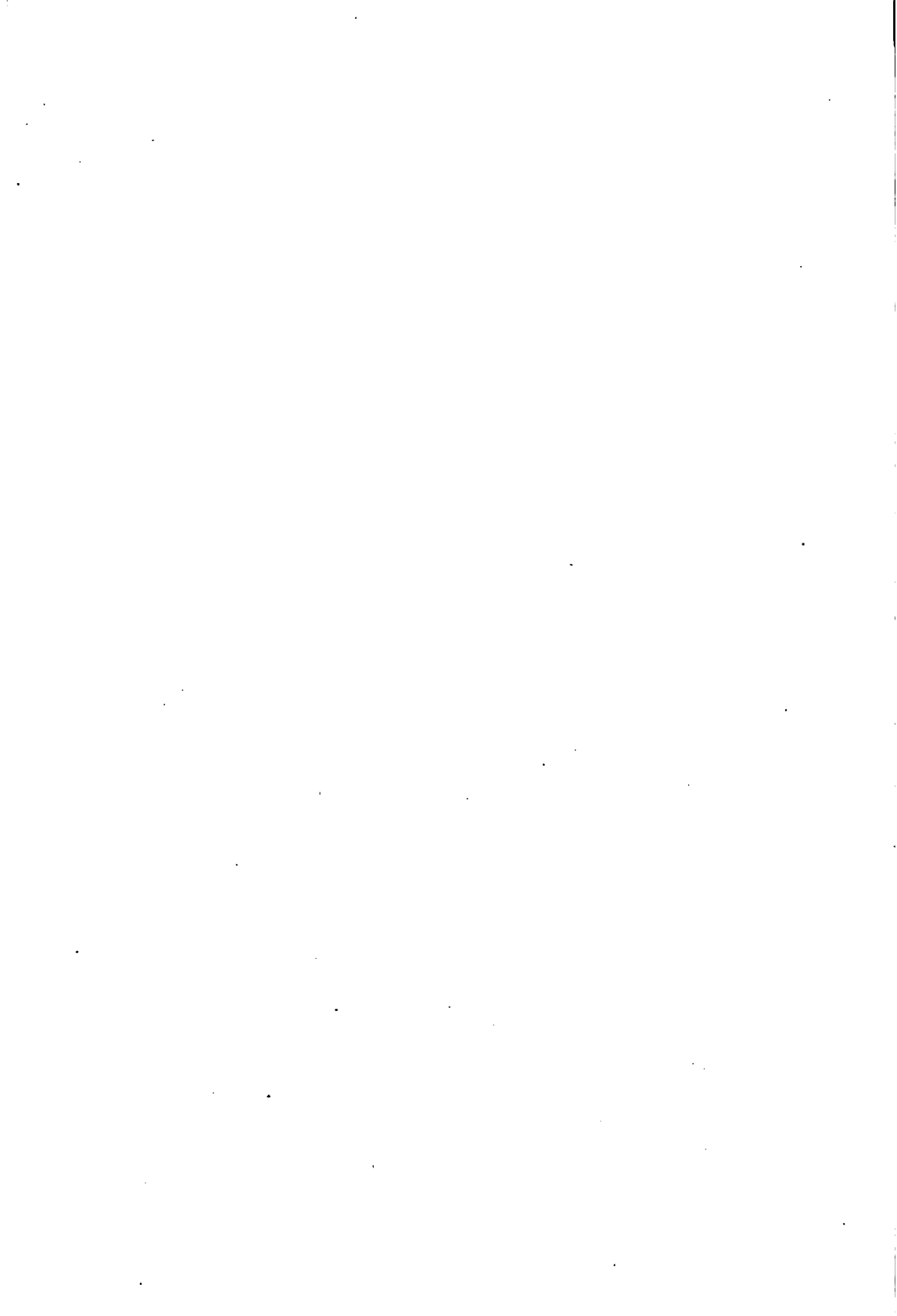
such a conclusion. Besides, the settling down of a Venetian colony of merchants at Limoges (who, by the way, came over in 988, or four years after the date given for the foundation of the five-domed church of Saint-Front) might at a later period, through their descendants and others who followed them, have brought Venice and the Périgord into communication with each other, whereas there is no suggestion of any intercourse with Constantinople. However, as a matter of fact, it does not affect the arguments I am about to lay before you, and therefore I pass by that contested question.

The task which I have taken upon myself to-night is to prove that the buildings which lie at the west end of the five-domed church, and which are known as the Latin church, and attributed to Chronopius II., Bishop of Périgueux in the early part of the sixth century (505—536), are in reality those of the church commenced by Bishop Froterius, continued by other bishops, and dedicated on March 21st, 1047, by the Archbishop of Bourges; that this church was burnt in a great fire which took place in 1120 A.D.; and that subsequently the five-domed church was built in imitation of St. Mark's, so far as the plan and general design are concerned—St. Mark's at that time being one of the wonders of Europe.

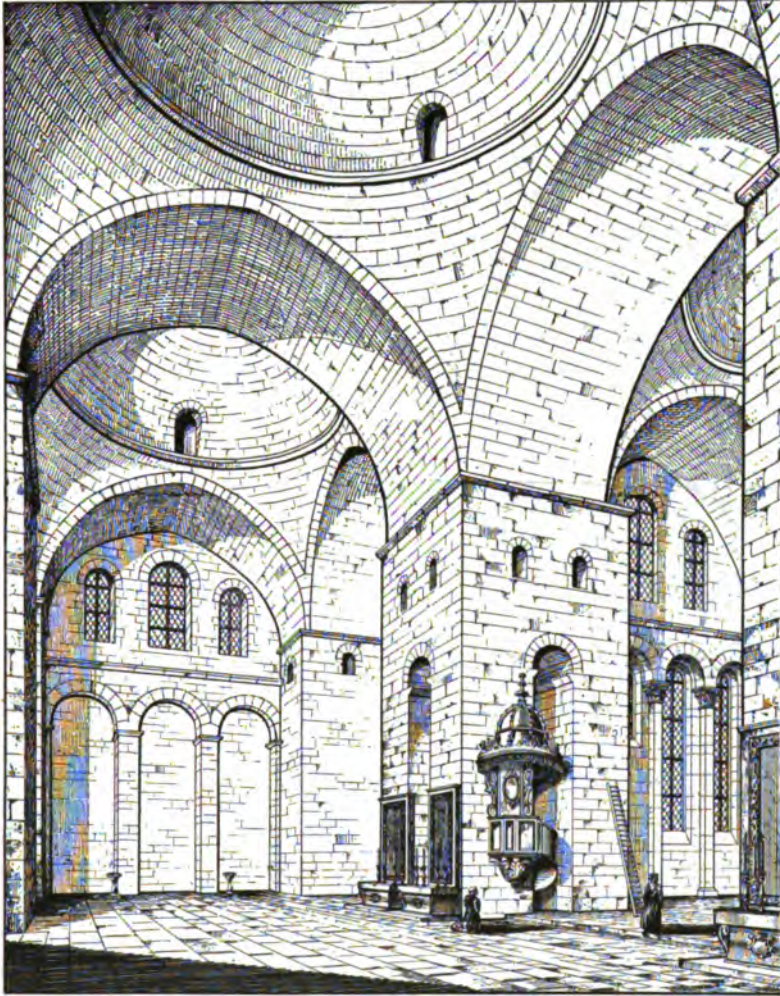
My best course will probably be to describe briefly the churches of Saint-Front first (see Plan, Ill. 68).

Commencing with the five-domed church, its plan is that of a Greek cross, with domes over the nave, crossing, transepts, and choir, all more or less of the same size. In St. Mark's (see Ill. 56) the domes over the transepts and the choir are smaller, owing to their being built between more ancient structures. In Saint-Front the three apses are placed respectively at the east end of the choir and on the east side of the two transepts. In St. Mark's they retained the triple apse of the old basilica. In Saint-Front the gallery passage is set against the wall (see Ill. 69). In St. Mark's they utilised the columns and capitals of the old basilica, and brought the gallery out to the front. The barrel vaults which carry the domes in St. Mark's are wider than those of Saint-Front, and the openings in the piers carrying the latter are therefore much narrower. Above the impost moulding of the main piers the





general design is the same, but the construction and interpretation of the arched vaults of Saint-Front (which are pointed),



69.—INTERIOR OF SAINT-FRONT. (From an Illustration by Edmund Sharpe.)

the pendentives, and the domes differ. The domes and vaults of St. Mark's were covered with lead (I am referring to the

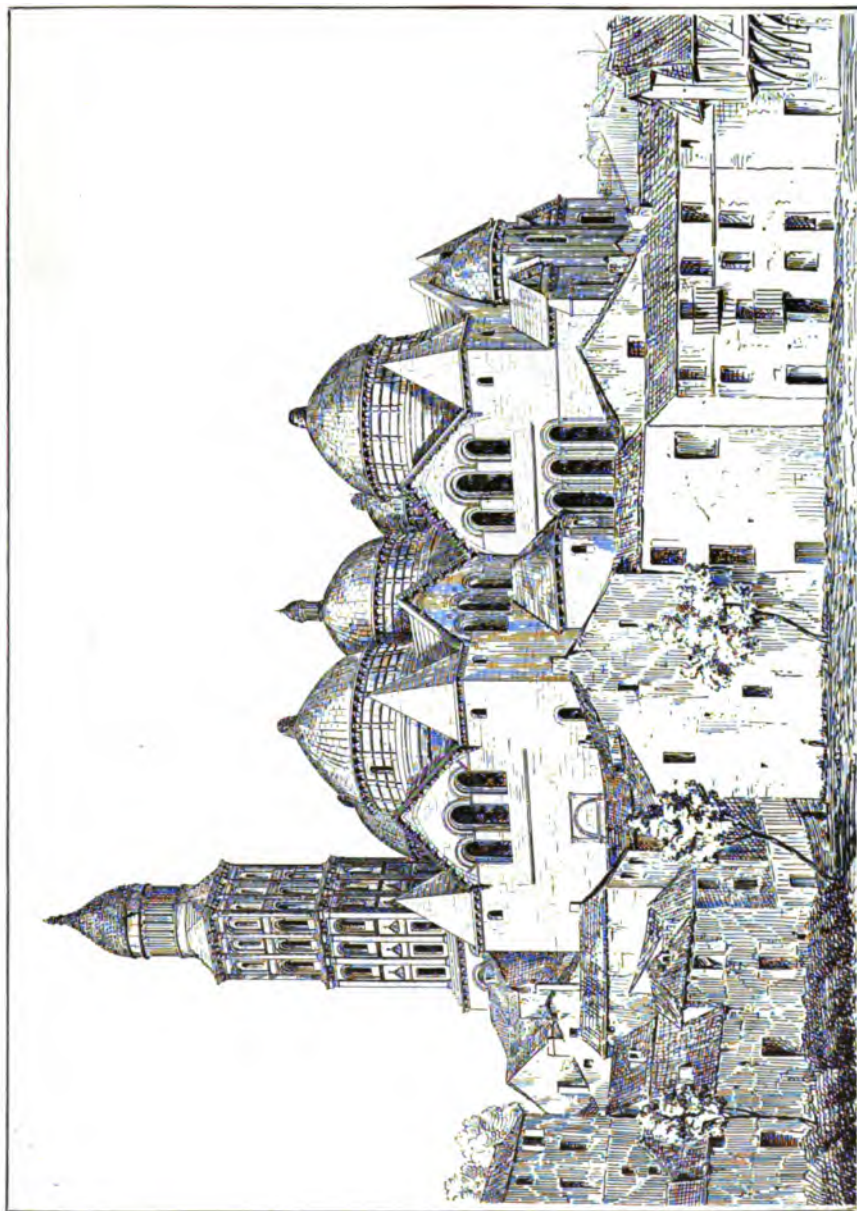
church as completed at the end of the eleventh century), the domes of Saint-Front with stone lanterns of remarkable design (Ill. 70), and the vaults with stone slabs, stepped. Both externally and internally the design of Saint-Front was extremely simple: it was faced with fine ashlar masonry, and the decoration is almost confined to the capitals of the wall arcades and to the double tier of columns in the apses. St. Mark's was built with a brick core, and two centuries were spent in decorating it with marble slabs and mosaic, and with capitals brought over from the East. Whether the builders of Saint-Front ever contemplated a similar outlay, or whether they intended to decorate the interior with painted decoration, is not known. The domes were built in rubble masonry and covered with plaster, so that it may have been intended originally to paint their surfaces. I am not aware that this was ever done.\*

At the west end of this five-domed church, and astride two bays of the nave of an older church, was built an enormous tower. A full description of the way in which this was done is given by de Verneilh in his book, and is certainly a most admirable account. The tower is plain up to a cornice on a level with the cornice of the lanterns over the domes of the church; above that are two lofty storeys, with two tiers of openings in each, the lower storey decorated with pilasters and capitals, the upper one with semi-detached shafts and capitals. It is crowned by a pyramid and a cone, carried on forty-eight shafts.

The two bays to which I have referred, as well as other buildings on the north-east and south-east respectively, and on the west side, formed part of a church which is known as the old or the Latin church. The two bays were probably the fifth and sixth bays of the church, on the east side of which may have been another bay, and a transept between the two confessionals which still exist, and beyond this transept three apses (Ill. 90). These were all removed when the five-domed church was built. On the west side of the two bays under the

\* The west dome of the cathedral of Cahors was painted with figure subjects, which were discovered in 1890 under several coats of whitewash. Others were found in the east dome, but in too bad a condition to be preserved.

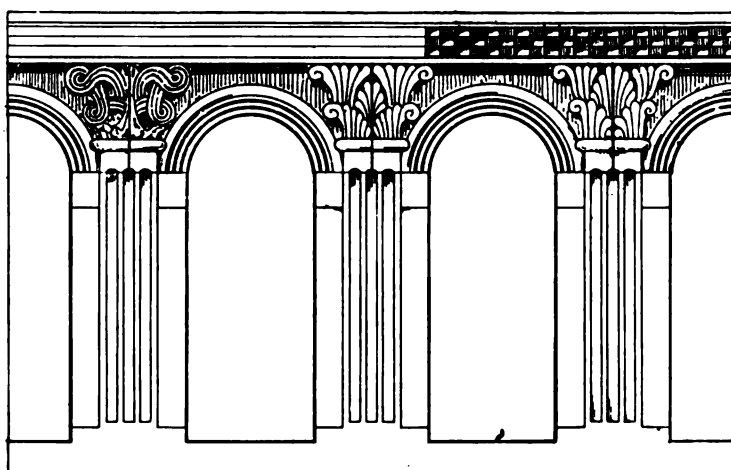




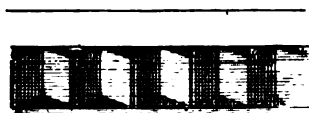
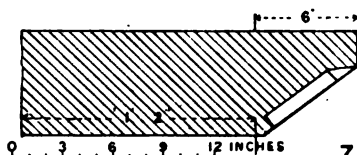
70.—EXTERIOR OF SAINT-FRONT, PÉRIGUEUX. (From an illustration by the late Edmund Sharpe.)





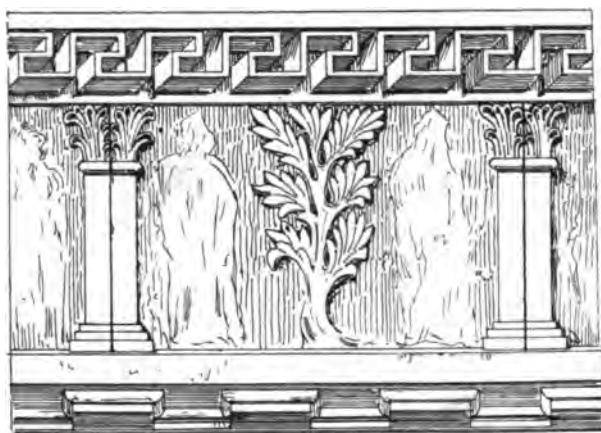
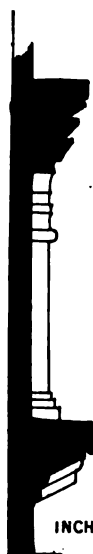


ARCADE ON WEST FRONT.



ZIGZAG MOULDING.

73.—FROM THE OLD CHURCH, SAINT-FRONT.



INCHES 12 9 6 3 0 1 2 3 4 FEET

74.—FRIEZE OVER PORCH OF OLD CHURCH, SAINT-FRONT.

great tower, and between them and the west front, there is space for three more bays of equal size to the other two and one narrow one. The nave was covered with a timber roof, as there are no traces of a vault on the eastern side of the west front. The aisles were vaulted over with a succession of barrel vaults, running at right angles to the nave. It is probable, therefore, that the western bay was vaulted in the other direction to resist the thrust of the series of barrel vaults, and this may account for the narrow bay. At the east end, on the north side, there is a pier, with a staircase in it. On the south side nothing remains of the old work except a thick wall running into the cloisters.

The west front still remains perfect, except for the grievous mutilation of its decorative features. It forms the internal wall of a house built against it on the west side, and most of its decoration was chipped off, the whole being covered with stucco. It was in this condition in the fifties, when de Verneilh was measuring it, and he had to trust to sketches made by a M. de Mourcin in the beginning of the century. This house has lately been acquired by the Government, and the stucco removed, so that it is possible now to see some of the detail left. Though fairly correct in the main lines, the artist has improved upon the details. Throughout this part of France they seem to have lavished all their resources of decorative design on their west fronts, the interiors being kept perfectly plain, and in this respect the west façade of the church must have been a very remarkable frontispiece. A conjectural restoration of it is shown in an engraving on Plate 8 in de Verneilh's work, already referred to, and Ill. 73 gives a detail of the arcade which crossed the west front. The wall surface of the west end, above this arcade was decorated with a zig-zag moulding crossing diagonally in various directions. In front of the west end was a porch, about 17 feet square, with a remarkable frieze (Ill. 74), mutilated as regards its figure decoration, but otherwise very perfect, and visible from the market place; the gable above it is hidden in other constructions. The cloisters are of twelfth and thirteenth-century dates; and as they and the other monastery buildings do not concern my argument, my description stops here.

I propose now to take up the several parts in detail, with a view of arriving at the probable date of their erection. Commencing with the so-called Latin church, this is sometimes called "*la vieille église*," to distinguish it from the other. De Verneilh, beyond calling it once Merovingian, does not attempt to fix a date. The paragraph in which he uses the word is amusing from an antiquarian point of view. *In the Latin church, he says, the pointed arch does not appear anywhere, even in the vaults; a remark which might seem superfluous; but as the pointed arch is largely used in the Byzantine basilica, one almost expected to find it in the Latin church. When pointed arches are accepted as tenth-century work, it would cost little to go further back, even to the Merovingian epoch.* As the only other period on record in which a church is said to have been built is during the episcopate of Chronopius II. (505—536), de Verneilh calmly suggests the possible employment of the pointed arch in France in the sixth century.

Now let us examine the structures still existing. The confessionals on the north and south sides are each divided by a row of piers carrying barrel vaults. The masonry of the walls, piers, and arches is of fair size,\* well wrought, and with thick mortar joints in relief. The imposts of the arches which served to carry the centres are not returned on the face of the piers, where they would not be required. All of these characteristics accord best with the work of the eleventh century, as found in the crypts of Saint-Cyr, Nevers (1028), or of St. Stephen at Auxerre, about the same period. They show a great advance when compared with the outer crypt of Saint-Germain, also at Auxerre, of the ninth or tenth century. It is quite impossible that the confessionals could date before the time of Charlemagne, because the masonry employed before, and, in fact, long after, his reign was composed of small stones with thick mortar joints, and with courses of bricks every 3 feet in height. It is true, as de Verneilh points out, a single row of bricks 2 inches thick is built in under the impost course, but that is an argument against their age. Not one row, but two or three, would have been employed in the

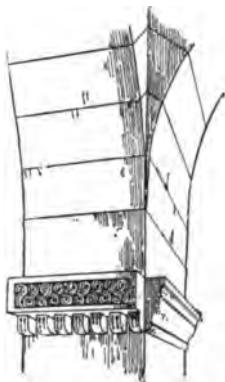
\* The courses in the piers are 12 inches high.

Merovingian period, and these brick courses would have been continued throughout the confessionals if they had been built prior to the tenth century. Bricks also would have alternated with the voussoirs of the arches, as in the Basse-Œuvre at Beauvais, Saint-Martin at Angers, Savenières, and all early buildings up to and including the tenth century.

The nave is separated from the aisles by complex piers—that is to say, on the side of the nave is a pilaster strip which probably carried the tie-beam of the main trusses, or possibly an arch\* thrown across the nave, as in San Miniato, Florence (1014). On the aisle side is another pilaster or respond which carried the transverse arched ribs.

But the coupling of piers was not introduced into France till the eleventh century.

The earliest examples known are in Italy (which at this time was quite a century in advance of France), in the church of Sant' Eustorgio at Milan, dating from the beginning of the tenth century, where they were introduced to carry arches across the nave and aisles. A second example is found in the church of SS. Felix and Fortunatus, near Vicenza, added in the second half of the tenth century. In churches of earlier date in France the cross arches were carried on impost mouldings crowning a square



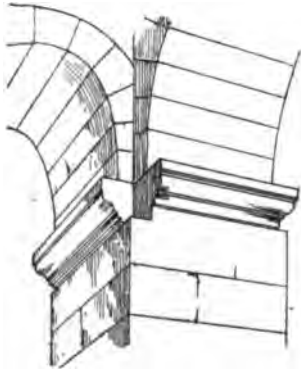
71.—IMPOST, GERMIGNY-  
LES-PRÉS.

pier. We find an interesting example of this in the church of Germigny-les-Prés (Loiret), built by Charlemagne in 806 A.D. The church was said to have been built in imitation of Aix-la-Chapelle, but there is no resemblance between the two, except that barrel vaults were employed on each side of the square central tower, and that the piers were built in stones of unusually large size, for that period at all events: here the piers are all square (Ill. 71), and the four cross arches are all

\* There is an argument in favour of arches. The barrel vaults perpendicular to the nave rise towards the nave wall. De Verneilh thinks this might have been to give a weathering to the stone slabs which covered them. But there are much simpler methods than this of giving a weathering. It is probable that the rising of the barrel vaults was intended to counteract the thrust of these arches thrown across the nave as suggested, unless they had in contemplation the vaulting of the nave at a later date, never realised.

carried on bold impost mouldings. At Granson, in Switzerland (built in the beginning of the eleventh century), rather than carry the pilaster down the pier, a recess is left in the upper part of the pier (Ill. 72) to give greater play to the arches and their imposts. In other words, *the articulation given to the architectural members which led to the great development of Romanesque and Gothic architecture was not recognised till the eleventh century in France.*

With regard to the barrel vaults over the aisles running at right angles to the nave, the earliest dated examples known are those in the narthex of Tournus Cathedral, built after the fire of 1006, and dedicated, with a portion of the nave, in 1009. De Verneilh suggests that they were copied from those of Saint-Front, forgetting that, according to his version as regards the date of this work, there is a trifling difference of six centuries between the two structures. Tournus, it must be remembered, is near Cluny, the great building centre of France in the eleventh century, and it is much more pro-



72.—IMPOST, GRANSON.

bable that they were built there first to avoid a second disaster by fire; thence they went to the north, to Saint-Remy, at Rheims; to the west, to Limoges (1028); and thence descended to Périgueux, probably about 1030. The thrust of the arches carrying these cross vaults on the south side is counterbalanced by the existing cloister, which probably replaced an earlier example. On the north side are buttresses. This, again, is an eleventh-century introduction. The Romanesque architect of Provence had already at an earlier date used pilaster strips with capitals, but this was a Roman tradition, and was employed only to break up the wall surface. There were no buttresses at Germigny. The earliest examples known in France are the semicircular ones of Saint-Remy at Rheims, of the tenth century. The square or rectangular buttress dates only from the eleventh century.



When we come to the west front, we are on more certain ground. The whole is constructed in ashlar work in regular courses ; and even in ascribing 1040 as the date, the execution of its ornamental detail is in advance of that found elsewhere in France.\* This is specially the case with the singular zigzag strings which decorate the front. In earlier examples, as in Saint-Généroux, we find hood-moulds to the windows, and triangular pediments between them. We also find a surface decoration similar to that which is known as *opus reticulatum*, and which they borrowed, probably from Roman sources. Occasionally, also, as in Saint-Généroux, patterns were incised on stones, and filled in with some coloured material. The architect of Saint-Front went further: he built his zigzag and horizontal strings 14 inches (Ill. 73) into the wall, and gave them a projection of 6 inches. The geometric ornament on them is cut with a regularity and precision quite unknown in earlier times; and although in some parts one meets with an archaic design, that is probably only due to a desire to introduce new features.

This remark applies to the arcade below the zigzag decoration (Ill. 73) and to the ornamental frieze on the porch (Ill. 74). Here, it seems to me, the artist was endeavouring to reproduce the designs found on ancient sarcophagi. The arcade is divided by small pilasters; the arch, the half capital on each side, and a portion of the shaft are all cut out of a single slab, and a joint running through the centre of the capital. The frieze over the porch is similarly divided with the joint through the centre of capital and shaft. In the centre is the tree of life—a favourite subject in ancient sarcophagi—with figures on either side which have all been chopped off. The introduction of figures at all is a proof of the late period of this front, for throughout the dark ages, from the fifth to the tenth century, even carved ornament is rarely if ever found, and at Germigny-les-Prés (806) nearly all the ornament is in stucco. It was the absence of this power

\* I am informed by M. Lambert, the architect-inspector of the works, that there are indications of four or five alterations or additions in the old church; so that it is possible the completion of this west front was carried far into the century, in which case its design and execution might bring the date more in accordance with that of other known examples, as, for instance, the west front of Le Mans Cathedral.

to find artists who could carve ornament which probably led the designer of the churches of the Merovingian era, and, with rare exceptions, those of the Carolingian era to decorate the wall surfaces of their buildings with courses of bricks and zigzag patterns of the same, and to alternate the voussoirs of their arches with brick courses. Saint-Martin at Angers (of which the foundation was laid by Hermengarde, the wife of Louis le Débonnaire, just before her death in 819), Savenières, Vieux-Pont-en-Auge (Calvados), and the Basse-Œuvre at Beauvais, all attributed to the same period, may be quoted as examples.

I have omitted to state that the nearest approach in style and character to the capitals of this arcade and frieze are those in the crypts of Saint-Cyr, Nevers (1028 A.D.), and of the cathedral of Auxerre (1030 A.D.).

The church which I have just described measures approximately 200 feet long and 130 feet through the transept, and including the two confessionals. It was, therefore, an important church for those times, and when compared with the other church which was dedicated on the same day, viz., that of St. Stephen of the City, was probably regarded as the most beautiful of the two.

If I have been able on architectural and constructional grounds to prove that the so-called Latin church could not have been erected before the eleventh century, it must have been the building referred to in the records,\* and the five-domed church must be attributed to a later date. The next records relative to the church are of the greatest importance as regards this question. There are three of them, taken from ancient chronicles, and as they are in Latin I have given them full in a note.† The third is apparently a transcript from the second,

\* Anno incarnationis D. noningentesimo septuagesimo sexto, Froterius episcopus ab Hugone, Capetio Francorum rege, Petragoras missus est et rexit ecclesiam annos 14, menses 6, dies 3. Obiit autem anno D. 991, V. idus decembris, et sepultus est in basilica S. Frontonis. Hic episcopus cæpit ædificare magnum monasterium S. Frontonis.

† Anno MCXX. XI. Kalend. Augusti monasterium Mariæ Magdalænæ de Vizellaco combustum est cum 1127 (sic) hominibus et feminis. Similiter incensum est monasterium sancti Frontonis civitatis Petragoricæ cum multis hominibus et feminis.

Guillelmus de Alba-Rocha, episcopus petragor., cujus tempore hujus sancti Frontonis et monasterium cum suis ornamentis repentino incendio, peccatis id

but the word "burgus" is introduced to distinguish the town church of Saint-Front from the city church, viz., that of St. Stephen the Cathedral.

The other two records read (leaving out the allusion to the church of St. Mary Magdalene, Vézelay,\* which was burnt apparently on the same day):—

1. "In the year 1120, 22nd of July, the monastery of Saint-Front of Périgord was burnt, with many men and women."

2. "William of Alba-Rocha, Bishop of Périgueux, in whose time the monastery of Saint-Front was burnt down, with all its ornaments, in a sudden conflagration, for the sins of the people, and the bells in the bell tower were melted in the fire. At that time the monastery was covered with timber roofs."

Exception has been taken that these records refer to the monastery and not to the church. But all the earlier documents also refer to the monastery and its building; consequently it may be assumed that the church was the more important portion. At all events, there is no doubt that the bell tower was part of the church: and as the fire melted down the bells in it, the timber-work referred to in the records was probably that which covered in the nave and transepts.

The last sentence of the second record is of the greatest importance. "*Erat tunc temporis monasterium ligneis tabulis coopertum*" seems to me to prove that the chronicler desires to call attention to the fact that he was not speaking of the then existing church, which was built entirely of stone, but of another and earlier church, the roofs of which were in timber, as those which I have described as covering the nave, and probably the transept, of the so-called Latin church.

It is quite evident that the sudden conflagration quoted in the records could not apply to the five-domed church, for, as I have already described it, there is no timber whatever in its construction—floor, walls, vaults, domes, lantern, and roof-slabs are all in stone—so that there was nothing to burn; and the same

*promerentibus, conflagravit, atque signa in clocario igne soluta sunt. Erat tunc temporis monasterium ligneis tabulis coopertum.*

*Hoc tempore burgus sancti Frontonis monasterium cum suis ornamentis repentino incendio, peccatis id promerentibus, conflagravit, atque signa in clocario igne soluta sunt. Erat tunc temporis monasterium ligneis tabulis coopertum.*

\* The narthex of Vézelay was built in 1130, after the fire.

applies equally to the tower, the west buttressing of which shows that the nave roof of the old church existed no longer.

My next task is to attempt to prove that the five-domed church and the tower on the west side were not constructed till after 1120 A.D. By this time the church of St. Mark at Venice was completed, so far as its main structure was concerned, and already the panelling of the walls with marble and the decoration of its vaults and arches with mosaic had made some progress. It was one of the wonders of Europe, and the idea of copying its plan and general design would appeal at once to a race of builders who for more than a century, as I shall prove later on, had been building domed churches throughout Aquitaine, who were perfectly acquainted with their own methods of building domes and pendentives, and therefore would not be obliged to trust to foreign workmen to execute them.

In speaking casually of the restriction in the size of the transept and choir domes of St. Mark's, Venice, I stated that it was in consequence of their desire to retain ancient walls; and the same remark applies equally to the other domes. The external walls of the old basilica, and the foundation walls, at least, of the aisles, fixed all the dimensions. (The width of the nave of St. Mark's is the same as in that of the old basilica.) Here in Saint-Front we find for the west dome a parallel instance of restriction. The two confessionals of the early church have been preserved, and the dome and its aisles are placed between them. There was no necessity to limit the size of the other domes, and in this basilica they did not copy St. Mark's, all the domes being of equal size.

This is, of course, purely a surmise on my part. It must be taken for what it is worth when comparing the two plans.

I have now to analyse the five-domed church as I did the other; and here my task is more difficult, because this remarkable church has actually, since 1856, been almost entirely pulled down and built up with new material. On the south transept wall remains about 30 to 40 feet superficial of the ancient stonework, and here and there within the building a lean capital suggests that it may be the old one, scraped, to make it accord with the new work.

Unfortunately for the historical value of the monument, the late M. Abadie,\* instead of copying the old work, was allowed to introduce "improvements" of his own—improvements which he thought the early masons would have adopted if they had had the taste and possessed the knowledge of the present day. For instance, the great pointed arched vaults which carry the pendentives were originally struck from a level below the impost mouldings (Ill. 82), so that, as a matter of fact, the height of the arch was only a little greater than the half-span of the arch. As I shall point out later on, the early masons had already found out the tendency to sink in the upper voussoirs of a circular arch; consequently, in accordance with their tradition, they adopted the pointed arch. Anxious, however, to retain the proportions of the arches of St. Mark's, which are circular and slightly stilted, they introduced the method adopted in the western dome of St. Stephen, and struck their pointed arches from a level below the impost, and so they are shown in de Verneilh. But Abadie thought the appearance had a "debased" character, so he raised them (Ill. 83),† the springing being now 21 inches above the impost level instead of about 15 inches below it. He also altered the distance between the centres of the pointed arch, which were about 5 feet 6 inches apart and are now only 2 feet. I might here point out that, at some period unknown, the four central piers of the church

\* The architect entrusted with the restoration.

† There seems to be a disposition of late in Paris to disguise the fact that in the restoration of Saint-Front alterations have been made, or that the centres of the arches have been changed; some denying that the level has been raised at all, and saying that it is an idea which should be at once refuted. But Abadie in his lifetime made no secret of the fact; on the contrary, in 1875, when he met Edmund Sharpe and others of the A.A. excursion party, he distinctly stated that he had raised the centres because the arches had a debased appearance: that to attempt to reproduce irregular methods of construction because the early masons had to be content with tentative efforts would be illogical, and that the architect would fail in his duty if he did not avail himself of all the resources of modern construction, so as to produce a result which should last for many ages. This opinion was held also by the Bishop of Angoulême, to whom I had the privilege of being introduced towards the end of the excursion. The bishop asked me if I was content with the results of my tour. I, not knowing his views, and perhaps incautiously, replied that I had been very glad to see these churches before they had been restored. This rather piqued his lordship, who replied that, when those responsible for the proper maintenance of the cathedrals and churches had been able to persuade the Government to make grants for their restoration, it was advisable that the works should be carried out as completely as possible, so that they might last for centuries.

had been encased with ashlar measuring about 9 inches thick.\* De Verneilh has attempted to account for this by a suggestion that these piers were giving way, and that this was done to strengthen them.

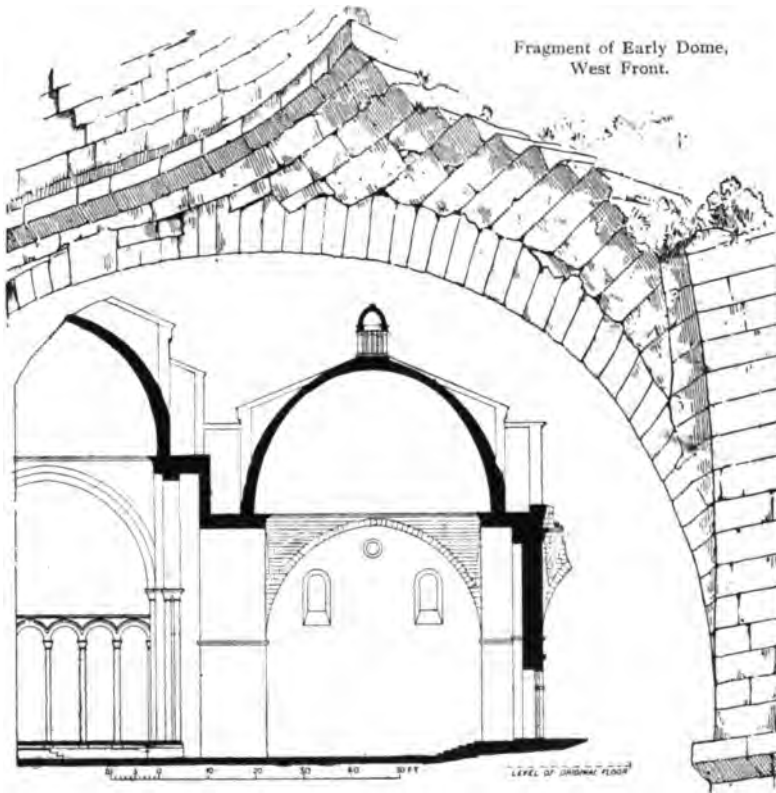
Having raised the arches, Abadie was obliged to increase the height of the upper portion of the church, which now presents a proportion different from that of the original structure. The original eastern apse was of shallow depth: it was replaced, in the fourteenth century, by a chapel dedicated to St. Anthony, of moderate height, 60 feet long. Abadie removed this, and replaced it by a Romanesque apse of enormous size, covering the whole area of the Lady Chapel, and with a vault rising higher than the main barrel vault of the church, so that it now dwarfs the whole building. He also, I think, raised the cupolas and the lanterns which enclose them, and covered the cupolas with rings of pine-cone crestings, which never existed, and which in all other buildings of Aquitaine are confined to the cupolas of towers. On the centre cupola there existed a small lantern cupola carried on shafts, but on the others were smaller features representing pine-cones: these he also replaced with lantern cupolas, and crowned the plain pyramids which flanked the gable ends with similar features, so that the cathedral now bristles over with pinnacles, like the cathedral of Milan, and the simplicity of the old work is no longer maintained.

This, however, is a digression from my subject. The drawings of de Verneilh, Viollet-le-Duc, Sharpe, and Petit, though they do not quite correspond in detail, are sufficient to prove that the execution of the ashlar masonry throughout, the regularity of the coursing, the fineness of the joints, the setting out and building of the pendentives and domes, must have been the result of long traditional experience of at least a century, and certainly not the first attempt to build such complicated features as those which are found throughout Saint-Front. The domes and pendentives show much greater knowledge of

\* When this was done, the impost moulding was raised above the old one. I am informed by M. Lambert that when this casing was removed during the restoration it was found that the stone used in the primitive construction was of inferior quality, hence the necessity to strengthen the piers.

stereotomy than that which is found even at Fontevault and Angoulême, built in the first quarter of the twelfth century.

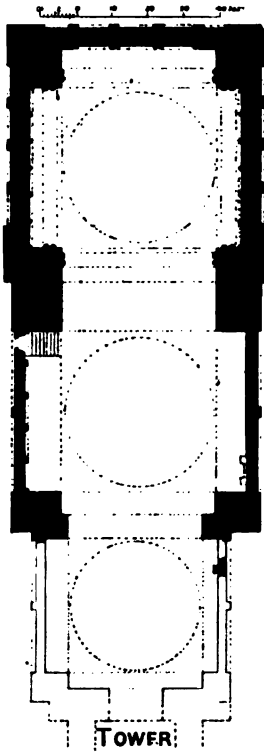
This is, however, not the only evidence I have to lay before you. In Périgueux itself is a valuable example, built about



Part Section.  
75.—ST. STEPHEN, PÉRIGUEUX.

1020—a fragment of the west dome and pendentive of St. Stephen, the church which was consecrated as the cathedral, on the same day as the church of Saint-Front, in 1047. Of this fragment I made a careful sketch last year with the camera lucida, which I have enlarged (Ill. 75), adhering strictly to the jointing drawn on the spot. In comparing this with the pendentive of Saint-Front, drawn out from de Verneilh's

measured drawings (Ill. 82), you will be able to judge for yourselves whether, at a period when the architectural development throughout France was progressing with such rapid strides, viz., the first fifty years of the eleventh century, it is possible that in 990 they should have been able to work the



76.—PLAN OF ST. STEPHEN,  
PÉRIGUEUX.

ashlar masonry with the perfection shown in Saint-Front, and thirty years later, when building the cathedral in the same town, there should be so remarkable a falling-off in the execution. This palpable discrepancy between the construction of the two buildings naturally also struck de Verneilh, who tries to excuse the crude and tentative efforts in St. Stephen's on the plea that the "architect of Saint-Front" (about whom nothing, by the way, is known) "died before he was able to train good pupils amongst the monks of the abbey. He was no longer there to give a profile of the moulding" (there are no mouldings, as we understand the term, in either structure) "or even to make a design for a capital. All the masons could do, therefore, was to copy Saint-Front as best they could, carefully avoiding all difficult construction such as that involved in the arched openings in the great piers, leaving out all the decoration, and to trust to gaining time by hurrying on the construction" (*sic*). I am afraid this plea can

scarcely be accepted as valid. The pendentives of the second dome of St. Stephen—viz., that now forming the first bay of the nave—show the same irregular junctions between the pendentives proper and the voussoirs of the pointed arch vault carrying them. The construction at that time was so tentative that it was necessary to cover the stonework with plaster. This is the case with all the other early domes of the eleventh century,

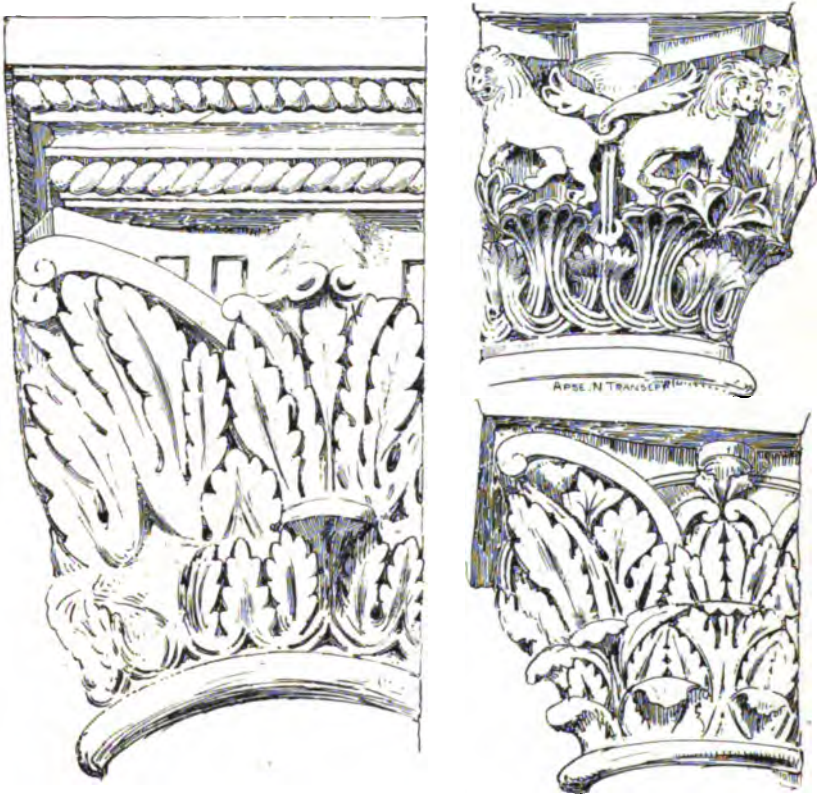


viz., at Saint-Avit-Sénieur, Cahors, and Saint-Jean-de-Cole. At Angoulême is, I think, the first dome in which the ashlar work was sufficiently well wrought to dispense with a plaster coating.

I now come to the second portion of my evidence, that which is shown in the capitals and other decorative accessories of the building. De Verneilh lays great stress on their Byzantine character, and his beautiful engravings would seem to bear out his contention. The influence of Byzantine art in Europe is a subject to which for some years I have devoted a considerable portion of my leisure time, and I selected Périgueux with the express object of continuing my researches into the Byzantine influence in early French work. So far as Saint-Front was concerned, the result was absolutely *nil*; not only is there no Byzantine feeling in the capitals, but there is even less than is found in other buildings of the twelfth century, and, so far as earlier periods are concerned, the contrast is all the more striking; for, curious to note, notwithstanding the superabundance of Roman work found throughout the South of France, the artists of the end of the tenth century and nearly the whole of the eleventh century seemed to prefer the interlaced patterns and the v-section leaves of the Byzantine school.

Not only are the capitals of Saint-Front not Byzantine, either in design or execution, but they are advanced Romanesque of the twelfth century. On that point I should like to quote the observations of the late Adolphe Berty, one of the most accomplished antiquaries of his time, to whom we owe the admirable drawings of the baptistery of St. John at Poitiers, made before its restoration in 1854, and of numberless other churches of all periods, and who wrote the description of Saint-Front to accompany Viollet-le-Duc's drawings in Gailhabaud's work. Berty, reviewing de Verneilh's statement that Saint-Front was anterior to the second half of the eleventh century, says: "So far as we are concerned, it appears extremely improbable that such could be the case. That a church was built by Froterius and consecrated in 1047 is a fact of which there can be no doubt, because the historical evidence establishes it; but that this church should be the one we now see, with its Corinthian capitals and domes, we do not believe." "The ornamentation

is, so far as we are able to judge, much superior in style to that which we are accustomed to find at the beginning of the eleventh century, and it betrays that influence of ancient monuments which, as we have often had occasion to remark, is much more felt in the twelfth than in the eleventh century."



On North Front.

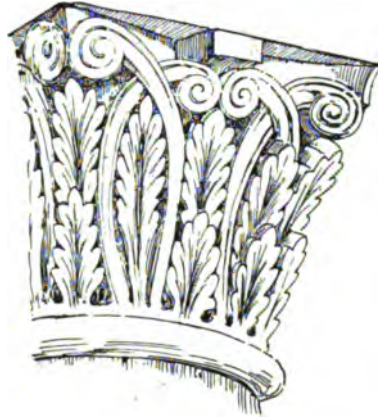
77.—CAPITALS OF SAINT-FRONT, PÉRIGUEUX.

I made several drawings of the capitals (Ill. 77), both new and scraped. I also drew the ancient fragments in the cloister, and subsequently, passing through the South of France to Saint-Gilles and Arles, I found in the pure Romanesque details of those churches of the twelfth century the same influence of Roman work which at that period began, as Bertz says, to exert

itself. There is one capital in particular, of which there are eight examples in Saint-Front (see Ill. 77), which, so far as the lower portion is concerned, is absolutely the same as some in the cloisters at Elne, also of the twelfth century; in fact, the same artist might have been brought over to carve them (Ill. 78). There is also a capital at Saint-Michel d'Entraigues (Ill. 79), dated 1137, which in design is similar to, in execution even earlier than, those of Saint-



78.—CAPITAL, ELNE.

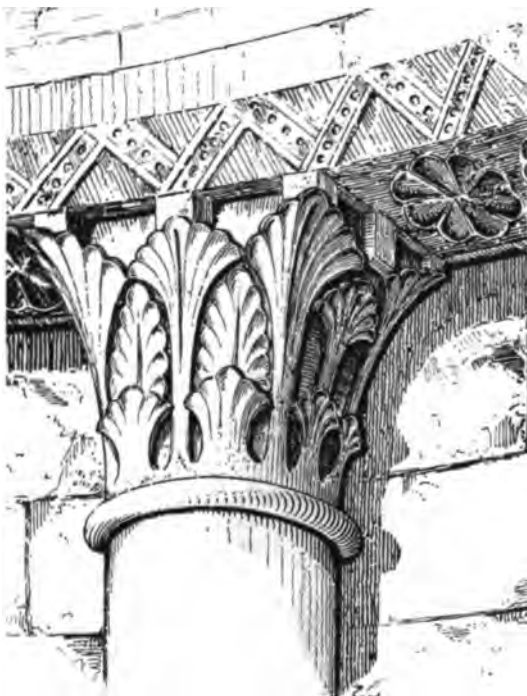
79.—CAPITAL, SAINT-MICHEL,  
D'ENTRAIGUES.

Front. In the apse of the same church the soffit of the architrave carried on shafts is carved with sunk coffers in imitation of Roman work (Ill. 80), and the same decoration was found in a similar position in the apse of the south transept at Saint-Front (Ill. 81).

It necessarily follows that if the bays of the nave and aisles of the old church were not built till after the year 1030, the great tower erected on them, which was built at the same time as, and formed part of, the five-domed church, could not have been erected at the latter end of the tenth century, as asserted by de Verneilh. In the style and character of its detail it

belongs to the same period as the five-domed church. In consequence of the enormous height to which the tower was subsequently carried, it was apparently found necessary to strengthen the tower walls, and openings in them have been filled in.

The logic shown in de Verneilh's description of its style is



*Drawn by T. Garratt.*

80.—CAPITAL AND ARCHITRAVE, SAINT-MICHEL, D'ENTRAIGUES.

perplexing, and it is a most singular thing that it should have been accepted up to the present day by all French writers, including even Viollet-le-Duc. As you are all doubtless aware, in front of the west end of St. Mark's at Venice stands the famous campanile. De Verneilh assumed that as the five-domed church of Saint-Front was copied from St. Mark's, so also the tower was copied, and was therefore Byzantine. But the

campanile at Venice was built in 902, 160 years before the domes of St. Mark's were built, so that he has no right to assume that it was copied, like the church, from a Byzantine model. There is, however, a still more cogent reason against his assumption—there was no bell tower in Constantinople to copy. Later on in his work, de Verneilh, finding that there were no analogous bell towers in the East, remarks that if the Byzantine architects had required such features, they could not

have done better than copy the tower of Saint-Front. Finally, he winds up his description by saying "that the bell tower of Saint-Front is the most ancient example in France, and, it may be said, *the only Byzantine bell tower in the world.*"

But not only is the tower not Byzantine, either in its form or in any of its details, but it is in its design distinctly opposed to the principles of Byzantine art. The Byzantine artists never employed columns except for constructional purposes, and the Roman method of breaking up the surface of their walls with pilasters and semi-detached shafts with their capitals was never imitated by the Byzantine architects after they had freed themselves from the trammels of



81.—SAINT-FRONT, PÉRIGUEUX. CAPITAL AND ARCHITRAVE, SOUTH-EAST APSE.

Roman art in the fifth and sixth centuries. The design of the tower is Romanesque, and its principle of decoration is copied from the superimposition of orders decorating the Roman amphitheatres, of which there still exist the remains of an important example in Périgueux itself.

To the west of this tower, and between it and the west front, are the remains of another structure, date unknown. It consists of four huge piers enclosing a square space, which, there is no doubt, was vaulted with a dome. This may either have been the first *motif* in the restoration of the old church after the fire, before a reproduction of the plan of St. Mark's was thought of, or it may have been added to form an entrance-porch to the new five-domed church; for in building the great tower they carefully preserved the passage through, and the principal entrance seems always to have been through the old church.

Having now given my reasons for attributing a much later date to the erection of the five-domed church of Saint-Front, viz., subsequent to the great fire of 1120, a new task is imposed on me. There is no doubt that many large churches, such as those of Angoulême and Fontevrault, were built in the beginning of the twelfth century, and consequently there must have been some other model for them, for it is not likely that such important structures would be the first attempts in that direction. This was the problem which puzzled me in 1892; and it was only solved, in my mind, at all events, last year, when I visited Périgord. The results of my researches are very different from what I had anticipated. It must be remembered that the supposed Byzantine origin of the domed churches in Périgord rested on two assumptions: (1) *That the five-domed church of Saint-Front was built between 984 and 1047, and was copied from St. Mark's, Venice, the latter being based on the church of the Holy Apostles in Constantinople, and therefore an Eastern importation.* (2) *That it was the five-domed church of Saint-Front which served as a model for all the domed structures in Périgord and the Charente*—though, curiously enough, as some archæologists have remarked, they never seemed to have copied the plan; for Saint-Front is still the only domed church in France with the Greek cross for its plan. Transepts were added, as at Angoulême, in order to afford additional accommodation for altars, but the plan there is that of a Latin cross.

Now the conclusions I have come to are these:—

(1) Domed churches were erected in Périgord early in the eleventh century.

(2) The construction of their domes and pendentives is entirely different from that found in Byzantine structures,\* and is, so far as I can ascertain, indigenous to the country.

(3) The plans of these early churches consisted always of a nave without aisles, and with one, two or more domes, built in a line running east and west, but not always of the same size.

(4) The vaulting of these churches with domes is only a variation from the ordinary barrel vaulting of the South of France, and was adopted because the builders thought they could be built with less material than those with barrel vaults, which required thicker walls or other equivalents to meet the thrust throughout their whole length.

(5) The domes of Saint-Front were built in accordance with the tradition of the country, with pointed arches, winding pendentives, and ovoid cupolas, and the plan only of St. Mark's was copied with other features up to the springing of the arched structure.

If I am able to prove these conclusions, it follows that the theory of the direct Byzantine origin of these domes in France falls to the ground.

I think my best course now will be to take up the second of these conclusions, viz., the construction of the Périgord domes, the peculiar nature of which has never, so far as I know, been clearly explained. Viollet-le-Duc's drawings are inexact, and his conclusions are not borne out by the facts. In justice to his memory I ought to say that, when he visited Périgueux for the second time (two years before his death), he told M. Lambert, the architect-inspector of the works, that he had

\* I might here point out that the Byzantine influence which was exerted in France and Germany from the sixth to the twelfth century is, with the exception of a few doorways and windows, *almost entirely confined to decorative sculpture*. (The brick courses in ancient French churches are of Roman origin.) In the *construction of vaults and arches* I know of only one example in France, the dome of the chapel of Saint-Ferreol in the church of Saint-Honorat (Île de Lérins), on the Mediterranean coast; and of two in Germany, viz., at Aix-la-Chapelle and in the small chapel of St. Bartholomew, situated about sixty yards to the south of the cathedral of Paderborn. Curiously enough, in the latter case, only the vaulting is Byzantine; the capitals are very early debased Romanesque, which show that masons, and not artists, were employed. The chroniclers of Charlemagne state that there are only two buildings in Germany on which Greek workmen were employed, viz., the tomb at Aix-la-Chapelle and the chapel at Paderborn, in the latter case "per grecos operarios" brought over by Archbishop Meinwerke in 1020.

misunderstood the structure, and he promised to correct his statements in the new edition he was preparing of his *Dictionnaire raisonné*. This was never published, as he died before it was completed.

Between the French dome and the Byzantine dome there seem to me to be six very important differences:—

(1) Pointed arch vaults carry the French pendentive; circular arch vaults the Byzantine.

(2) The earliest French pendentives and those of Saint-Front are set out on the intrados of the arch; the Byzantine pendentive is set out on the extrados.\*

(3) The pendentive in vertical section is a curve of double flexure in the French domes; in Byzantine domes it is part of a sphere.

(4) The earliest French pendentives are built in courses with a horizontal bed, and each course is horizontal. The Byzantine pendentive has sometimes horizontal and sometimes arched courses; the beds, however, are not horizontal, though they are not always normal to the curve.

(5) The French dome is set back behind the string course which crowns the pendentive.†

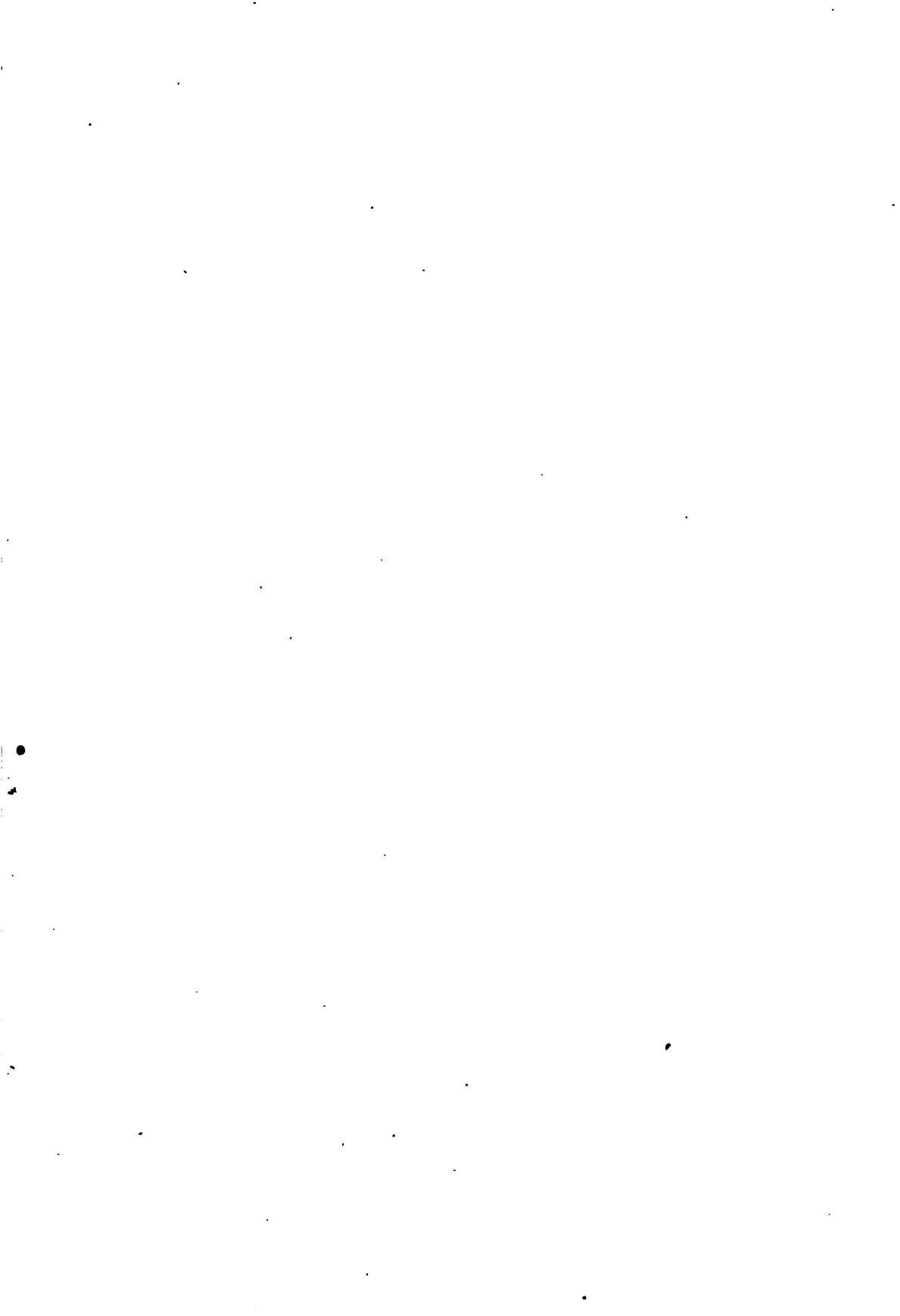
(6) The French dome is ovoid, and not spherical.

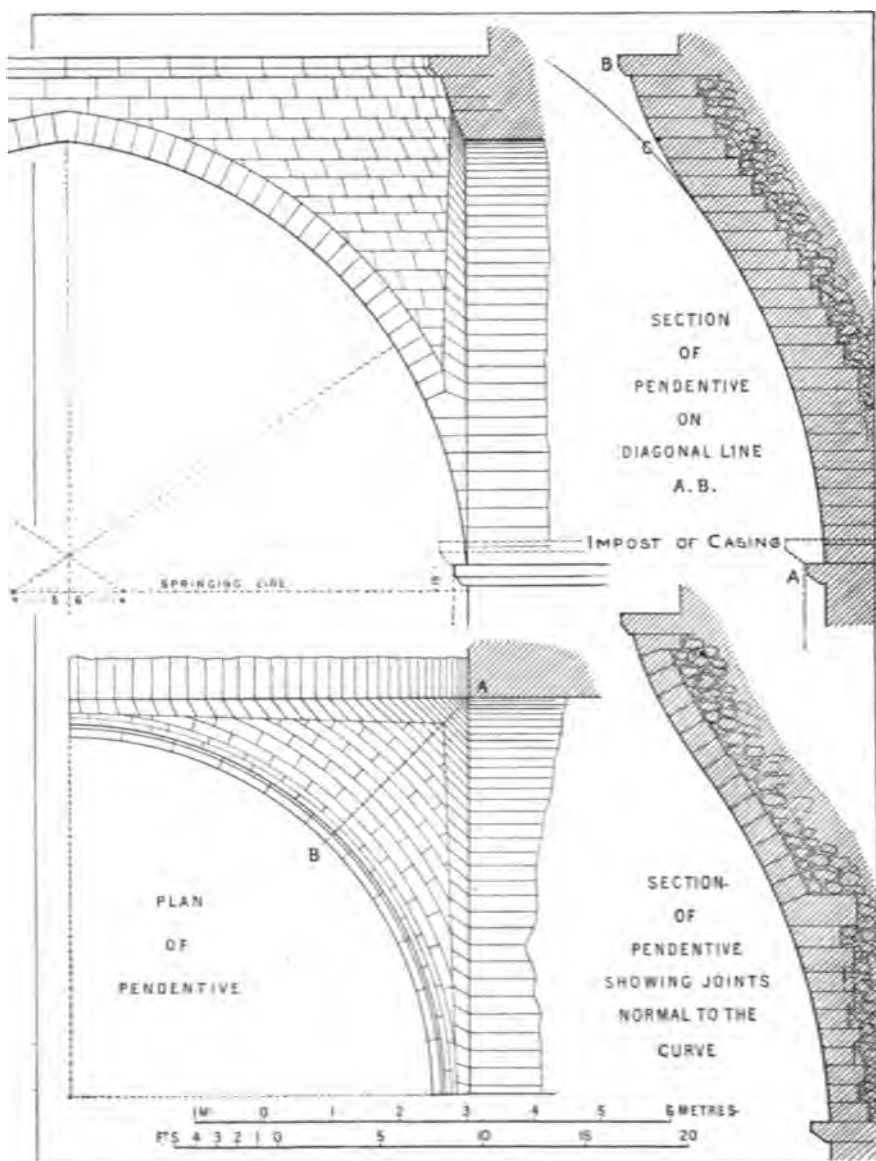
1. The use of the pointed instead of the circular arch was probably first suggested on account of the tendency to sink, inherent in the crown of the latter. There was, however, a second reason which was pointed out by Fergusson forty years ago, viz., that as the French builders desired to protect their vaults externally by laying the roofing tiles direct on the vault, less dead weight was required on a pointed than on a circular vault. The same object probably dictated the choice of an ovoid instead of a spherical cupola. In St. Mark's at Venice and in the larger Byzantine examples the domes are covered with lead, which was laid direct on the dome or vault without any filling-in.

\* At least, primarily so, part of the voussoirs is occasionally buried in the pendentive, just as part of a rib is carried behind the web. In smaller domed vaults, such as in those of the aisles of St. Sophia at Constantinople, the rib is entirely buried in the cupola, and the vault rests on a skewback. The same construction is found in the chapel at Paderborn just referred to.

† This remark refers to the great domes of Périgord only.







82.—SAINT-FRONT, PÉRIGUEUX, PRIOR TO ITS RESTORATION.

2, 3, and 4. The setting out of the pendentive on the intrados instead of the extrados of the arch is one of the most peculiar features of construction I have ever met with. I have searched diligently through M. Choisy's *L'Art de bâtir chez les Byzantins*, and I can find no example of large size which approaches it. Centering was provided for the main arches, but not for the pendentives; it was not required, because they were built in horizontal beds. It was necessary, however, to set out a guide line for the curve of the pendentive proper, and of the voussoirs which in these French domes formed part of it. Whether it was found more convenient to provide a vertical or horizontal guide line I do not know; but as *every horizontal section through the pendentive was part of a circle, the centre of which was in the axis of the dome*, the latter would probably have been found the simplest. There is no difficulty whatever in setting it out; the intrados of the two contiguous arches are the guides, and a curve struck at any level with the centre in the axis of the dome determines its extent. The vertical section through the diagonal of the pendentive gives a line of double curvature, the nature of the double curvature depending on the distance between the two centres of the pointed arch. In the first dome of St. Stephen's the distance is about 12 inches to 18 inches only, in the second 30 inches. In Saint-Front, before the restoration, I calculate it to be 5 feet 6 inches. The double curvature is much more marked in Saint-Front, therefore, than in St. Stephen.

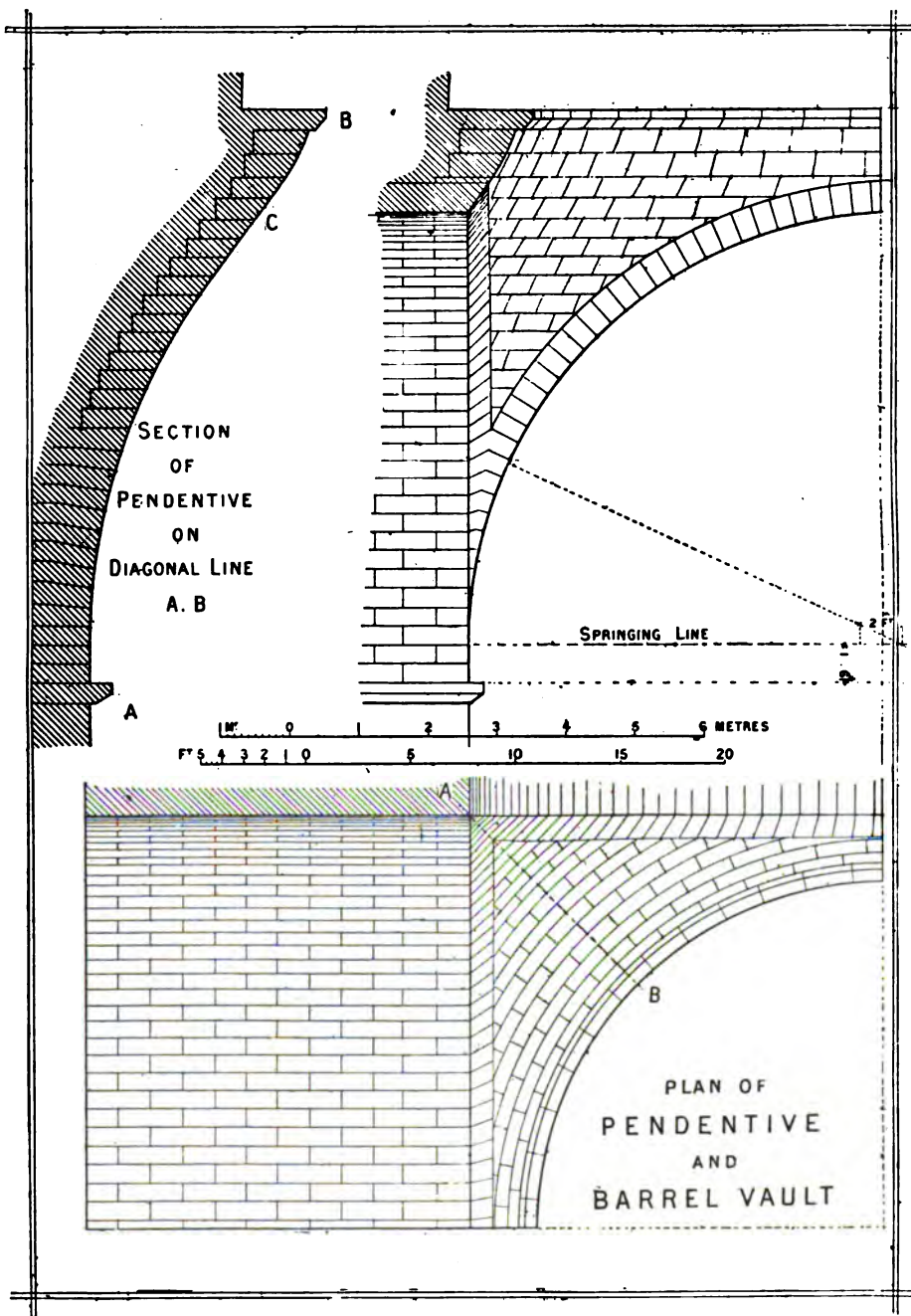
This accounts, however, only for the curve up to the soffit of the keystone; above that it was left to the mason to determine at will. As a rule, the return curve was continued up to the string crowning the whole pendentive. In one of the domes of Saint-Front, however, viz., the western dome, there is a distinct bend outwards on a line with the apex of the voussoirs. This, I was informed by M. Lambert, existed in the original dome, and was set back (Ill. 82) to obtain more light because of the tower on the west side. The height to which the pendentive is carried above the voussoirs of the arch varies in Saint-Front—one, two, or three courses being found.

I have already stated that in the original barrel vaults of Saint-Front the springing of the pointed arches was about

15 inches below the impost moulding crowning the rectangular piers, and the pendentive commenced at the impost level. When the four central piers were enclosed in a casing, about 9 inches thick, the new impost was raised about 12 inches (Ill. 82). Apparently, therefore, the springing of the four arches carrying the central dome was 27 inches below the top of impost, and it was this which increased the "debased" character attributed to it by Abadie. The lower eight voussoirs of the arch were all laid with horizontal beds, forming what is known as the *tas-de-charge* (horizontal pile) in French vaulting. The *tas-de-charge*\* is found in all the early domes, and varies from six to eight courses, according to the size of the dome. In the church of Saint-Front, as restored, there are only four courses with horizontal beds in the central and east dome above the springing, and five courses in the western dome. The distance between the centres of the pointed arch in the original church was (so far as I have been able to calculate it from drawings and illustrations made before the restoration) 5 feet 6 inches. In the restored church the distance is only 2 feet (Ill. 83); and as the soffit of the keystone has been rounded off, the arch has almost an elliptical curve. The curve of double flexure, therefore, is scarcely apparent in the new work.

The filling in of the pendentive between the voussoirs begins above the tenth voussoir; above that, probably, the first three courses would be laid on horizontal beds. Above these, the beds of the pendentive of Saint-Front are either laid on horizontal beds or are normal to the curve. Those of St. Stephen and all early domes have horizontal beds. There were three pendentives with horizontal beds in Saint-Front—two in the east and one in the north—the others had their beds normal to the curve. I asked M. Lambert the reason for this, and he stated that apparently they found they could carry on the work quicker and with less material in the ashlar blocks with beds normal to the curve of the pendentive, provided the

\* The eight beds of the lower voussoirs are incorrectly shown in the diagram (Ill. 82), both in elevation and section; up to a height of about 7 feet (D), or one-third of the height of the arch, the courses are all laid with horizontal beds, and this is the proportion generally followed for the *tas-de-charge* in French vaults. The reverse curve commences about 3 feet below C, the level of soffit of keystone.



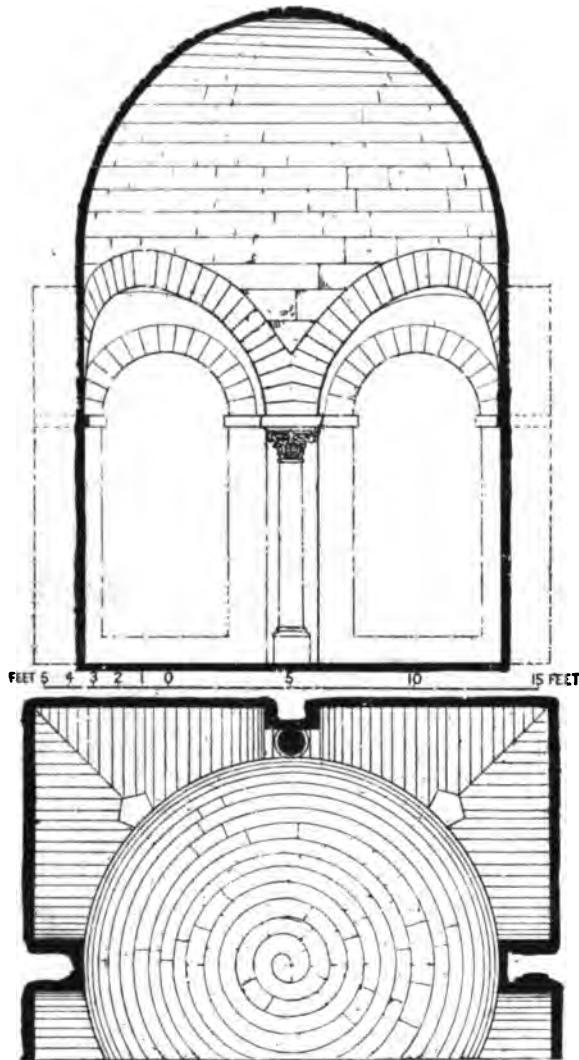
83.—PENDENTIVE AND VAULT, SAINT-FRONT, AS RESTORED 1856—1871.



blocks in each curve were temporarily supported (for no centering was employed for the pendentives), and in the upper courses there were holes in the back of the stones which suggested that they had been suspended until the course was completed.\*

In the pendentives which I have just described, as the arch forms part of the pendentive and the curve is carried up above the extrados of the arch, it follows that the voussoirs at the apex lean over towards the centre. For some reason or other this did not appeal always to the taste of the masons or of their directors, and in the second dome of St. Stephen's we find another method. The voussoirs at the apex are kept vertical, the lower portion still forming part of the pendentive. This gave a peculiar winding line to the extrados of the arch, which was far from pleasing, and it seems to have troubled the masons more than the setting out of the first system, to judge by the irregular construction. It was nevertheless employed from time to time even in the Charente domes. The third method would be to make both apex and springing in a vertical plane, in which case we return to the ordinary method of carrying pendentives, viz., on the extrados of the arch, excepting, of course, that in France the arches were always pointed. They do not seem, however, to have liked the junction of the curve of the pendentive and the vertical face of the arch, so that in Roulet and Rioux-Martin they carry a hood mould at the intersection. I ought, perhaps, here to state that in the course of the development of the style an additional rib or order was provided under the main arches, and this is found in all the Charente churches, except in the west dome of Angoulême. We see in the Charente a fusion between the systems employed in the barrel vaulted churches and in the early domed churches, in order to get rid of the enormous piers in the latter. The architect of Saint-Front seems to have steered between the two: he adopted the simple arch vaults and great piers of the first dome of St. Stephen's, but he lightened and gave greater

\* I contributed an article some years ago to the *Journal of the Royal Institute of British Architects*, Vol. IV. N.S. pp. 256, 282, in which I pointed out that in Persia down to the present day they build their stalactite vaults in this way, the source of my information being Mr. Purdon Clarke.



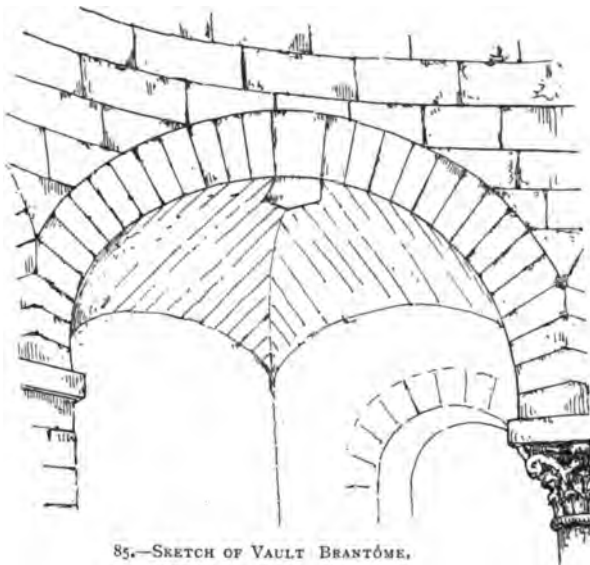
84—PLAN AND SECTION OF CHAMBER IN TOWER, BRANTÔME.

elegance to his piers by forming openings in them, in imitation of those of St. Mark's, Venice.

5 and 6. The domes in Périgord are set back distances varying from 18 inches to 3 feet behind the string crowning the



pendentives. In the East the dome or lantern is either a part of the same sphere as the pendentive, as in the cupolas of the Golden Gate at Jerusalem; is raised, being struck from a higher centre, as in St. Sophia, Constantinople; or surmounts a drum; in all cases there is no setting back.\* In Saint-Front, as rebuilt, the dome is ovoid, and from the nature of its covering must always have been so. It has, however, I think, been raised, and the lower courses up to the level of the cornice of the lantern outside are all built with horizontal beds. All the early domes



were built with centres, with stones of small dimensions and with their soffits plastered. The imprint of the planks which formed the centering is still visible in St. Stephen's, and it is clearly described in de Verneilh as existing in Saint-Front before restoration; the cupolas now are all built in ashlar in 9-inch courses.

I have now to return to the first of my conclusions, relative to the existence of domed churches early in the eleventh century.

\* There is one exception to be made, however; the first dome of St. Stephen's was not set back. There is not sufficient of it left to decide whether it was ovoid or not.

The earliest dome in France I am acquainted with is found in the church of Germigny-les-Prés, already alluded to, built in 806. The north and south-east bays of the aisles, measuring about 7 feet 4 inches square, are covered with cupolas resting on squinches. The lower portion of the tower of Brantôme, near Périgueux, is vaulted with a dome so original in its construction, and so unhesitating in its execution, that it must have been the result of many previous trials (see Ills. 84, 85, 86).



86.—CAPITAL IN BELFRY, BRANTÔME.

The upper portion of the tower (very remarkable in its design) dates from the eleventh century, but the masonry of the sub-structure suggests an earlier period. It is built over an oratory much more ancient in its foundation, and may therefore possibly have been erected in the tenth century. In the centre of each side of the square chamber within the tower pro-

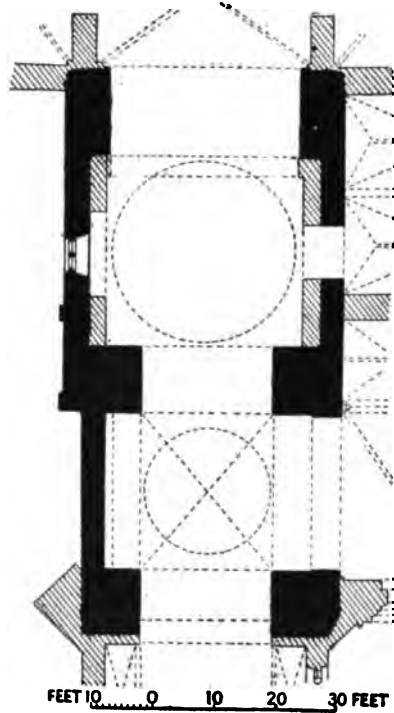
jects a pier; from pier to pier arches are thrown, which in plan form a circle. Above these arches is carried an ovoid dome, the lower courses of which have probably a horizontal bed, as the upper portion is built in spiral courses.\* The soffit of the arched vault is built with ordinary intersecting barrel vaults. Whatever the date may be, it suggests at all events that the erection of domes was not at that time unknown in the South of France. Three of the piers had originally an ancient column and capital in front: of these only one remains.

There is another dome at Saint-Martin, Angers, which forms

\* The dome of San Vitale is built in spiral courses, necessitated by the nature of the construction, which consists of earthen pots used for the sake of their lightness, and the foot of one pot is fixed in the mouth of the pot preceding it. Here, in Brantôme, I imagine the spiral form was adopted to dispense with centering.

part of the rebuilding in 1020 of the church founded by Hermengarde in 819. It is a portion of a perfect sphere, and the lower part of it, viz., that which is known as the pendentive, is set out on the intrados of the arch—this time a circular arch. The date of this dome (1020) is later than those I have mentioned; but it proves that domes, even in Anjou, were not unknown, and the perfection of its construction suggests that it was by no means a first attempt.

The first domed church actually dated is that of Saint-Astier, nine miles distant from Périgueux (Ill. 87). The domes no longer exist, but the immense piers of the interior, similar to those of St. Stephen's, Périgueux, leave no doubt as to their having been erected to carry domes. The church was commenced early in the eleventh century, and dedicated in 1013. The dome of the first compartment was replaced by a ribbed vault in the thirteenth or fourteenth century. It may have been built on circular arches. The second dome was raised on pointed arched vaults, and

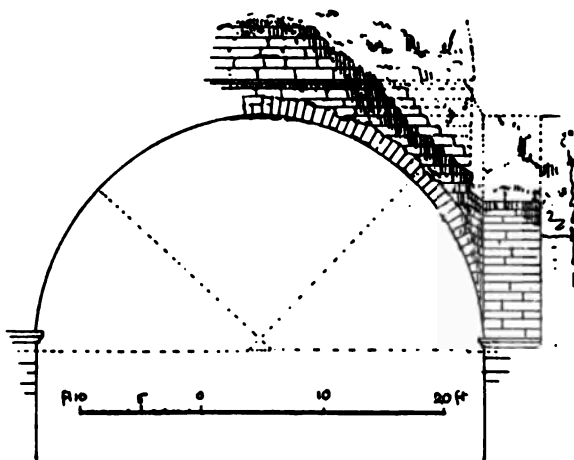


87.—SAINT-ASTIER.

the upper part of the south wall still exists under the roof, with the chase 6 inches deep, into which the pointed barrel vault was built in. I am inclined to the opinion that the first church, dedicated in 1013, had only one dome, and perhaps a porch or narthex, which may have had a tower over it. If this surmise be correct, it follows that the custom which prevailed afterwards of having a series of domes originated in the desire to increase the size of the church. The second

dome was replaced by a barrel vault, I think, in the seventeenth century.

The church of St. Stephen, Périgueux, is the second example: it was commenced in 1013, and dedicated in 1047 as the cathedral of Périgueux, on the same day as Saint-Front. Of the western dome only a fragment remains, sufficient, however to determine its dimensions and design\* (Ill. 88). The second dome is still intact. Here, again, the fact that the latter is larger than the first, and not quite in the same axis (see Ill. 76), suggests that one domed bay only was contemplated



88.—ELEVATION OF PENDENTIVE, ST. STEPHEN'S, PÉRIGUEUX.

in 1014; but as the basilican church of Saint-Front increased in size, a second bay with dome was added to the first one of

\* It should be noted here that in the elevation given of the fragment of the west pendentive (Ill. 88) the appearance of the arch is semicircular, and its height being less than half the width, the centre would be below the impost moulding; but as a matter of fact the centre voussoirs have sunk, owing probably to an attempt to cut off their projecting portions. Inside, however, the arch is pointed, the distance between the centres being about 15 to 18 inches, and their level about 12 inches below the impost moulding. Owing also to the great weight of the superimposed wall, the haunches have risen slightly, which makes it difficult to determine the exact original form of the arch. A pointed arch, however, the height of which above the impost is less than half the width, must have its centres below the impost, unless there were four centres; this, however, would not accord with what remains of the pendentive on the south-west side. The elevation of this arch has been worked out from a large photograph by M. Robert, the photographer to the Bureau des Monuments Historiques.

St. Stephen's, in order to rival the twin church. Towards the end of the twelfth century a third dome of advanced style and greater elevation was added. A bell tower of considerable size is shown in Belleforest's *Cosmographie Universelle*, 1575: this stood on the west side of the first dome mentioned. It is of similar design to that of Saint-Front, but without the pilasters and semi-detached shafts. Instead of the cupola lantern, it is crowned with a spire with marked entasis, pierced with small openings.

A third church, that of Saint-Silain, existed at Périgueux, but was destroyed during the Revolution; it is not actually known whether it had domes or not. It was 100 feet long by 57 feet wide, which would allow only of two domes; but it may have been a basilican church like Saint-Front.

The church at Brantôme, contiguous to and on the east side of the tower before referred to, was built between 1050 and 1080. According to de Verneilh, who saw the building before it was restored, or rather rebuilt, by Abadie, it had two domes, the western dome, contrary to the custom, being the larger. All the masonry is now absolutely new, inside and outside; but although I could distinguish where the domes might have been, and could recognise that the plan of the church had been governed by the foundations, I am not able to give any further evidence.

The church of Saint-Jean-de-Cole was built about 1086. It has only one dome, but larger than any of its predecessors, being 46 feet in diameter.

The church of Saint-Avit-Sénieur dates probably from the end of the eleventh century. It consists of a nave which was vaulted with three domes in succession, the eastern dome being probably the first built, on account of the size of its piers. The domes and pendentives exist no longer, having been replaced in the thirteenth century by ribbed and barrel vaults, built on the old piers, which still remain intact.

Then we have a series of smaller churches, with domes varying from 16 to 21 feet in diameter: Tremolac, in the form of a Latin cross, with three domes over the nave and one over the crossing; Bourdeille, with three domes and an apse; Peaussac, with three domes; and Le-Vieux-Mareuil, with

three domes and a square apse. All of these examples show the gradual fusion between the domed churches and those with barrel vaults. The huge piers of Saint-Astier and St. Stephen disappear, their places being taken by external and internal buttresses; that is to say, the thrust of the main transverse arches is brought well within the walls by piers, with arches thrown longitudinally from pier to pier. The small size of the domes doubtless enabled the builders to adopt this system in place of the huge piers; but Saint-Avit-Sénieur, with its two western domes 38 feet in diameter, already shows the change. Owing possibly to the diminution of the piers, in this instance the domes fell down in the thirteenth century. Of Saint-Amand-de-Colly I have no plan, and can find no description. There would seem to have been only one dome over the crossing; its pendentive belongs to the first method, and, owing to the fact that the arches carrying it are more than usually pointed, the double curvature of the pendentive is very marked.

In the parish church of Saint-Emilion (Gironde) the second and third bays of the nave are covered with domes, which still exist in fair preservation. The pendentives belong to the first method, but the upper voussoirs lean over only to a slight extent.

Of churches with large domes, the churches of Cahors and Souillac, both on the south-east of Périgueux, are of early date, judging from their plan. Cahors was consecrated in 1119. It consists of two large domes 50 feet in diameter, and a semi-circular choir, with three apses of later date. Souillac has the plan of a Latin cross, with two domes over the nave, one over the crossing, barrel vaults over the transepts, and a semicircular choir with three apses, two other apses with polygonal external walls being on each side of the transepts. This church, as also that of Solignac, near Limoges, retains the simple piers of the older type of church, though the latter was not consecrated till 1143. The pendentives of Solignac belong to the third method, that is to say, the arches lie in vertical planes. This result, however, is obtained by having four independent pendentives in the angles, each with a radius about three-fourths of the usual dome radius. The horizontal plan of the upper portion

of the pendentive consists of four circular angles joined by straight lines over the top of the arch voussoirs. The cupola carried above follows the same irregular curve.

Early in the twelfth century a new feature is introduced, viz., the addition of an extra rib under the principal arches, forming a second order, this rib being universally carried on coupled shafts with Romanesque capitals. The first introduction of this rib would seem to have been made in Fontevrault, commenced in 1101, and consecrated (so far as the nave with its four domes is concerned) in 1119. The domes are gone, but the piers and foundations still remain as evidence of their existence. Whether the setting out of the pendentive is based on the first, second, or third method I do not know. De Verneilh gives a section, but as he never seemed to recognise any distinction between them, and always indicates the third method, even in Saint-Front and St. Stephen's, which we know to be wrong, his sections cannot be depended upon.

Now all the early domes, viz., those in the churches of St. Stephen, Périgueux, Saint-Jean-de-Cole, Saint-Avit-Sénieur, Cahors, Souillac, and Solignac, are all coated with plaster so far as their pendentives are concerned. Whether that was due to the fact that their construction was of a primitive and tentative character, such as we see in St. Stephen, I do not know. When we come to the domed churches of the twelfth century we find that they are all executed, so far as the main barrel vaults and pendentives are concerned, in ashlar masonry. The tradition of a century enabled the builders to set out their work with precision, and there was no longer any need to mark the irregularities of the masonry with a coat of plaster.\* The cathedral of Angoulême was rebuilt more or less by Abadie. Ashlar masonry, however, is shown in Thomas Allom's drawing made in 1846; and the setting out of voussoirs and pendentives belongs to the first method.

There seems to be some difference of opinion about the actual date of the western dome of Angoulême Cathedral. De Verneilh claims it as built in 1017 in imitation of Saint-Front. Sharpe, Parker, and Petit state that it was rebuilt in 1130, with

\* I have not seen Fontevrault, and from the fact that the nave is used as a prison, neither Parker nor Petit was able to get access to it.

the other portions of the nave. There is no doubt, however, that the west dome partakes of the earlier character of the plan, and the size of its piers proportionally accords best with those of Saint-Avit-Sénieur. I should be inclined, therefore, to ascribe its erection to 1120, when they began to rebuild the church.\* The other bays all have the extra rib and coupled shafts which mark the transition from the earlier to the later development.

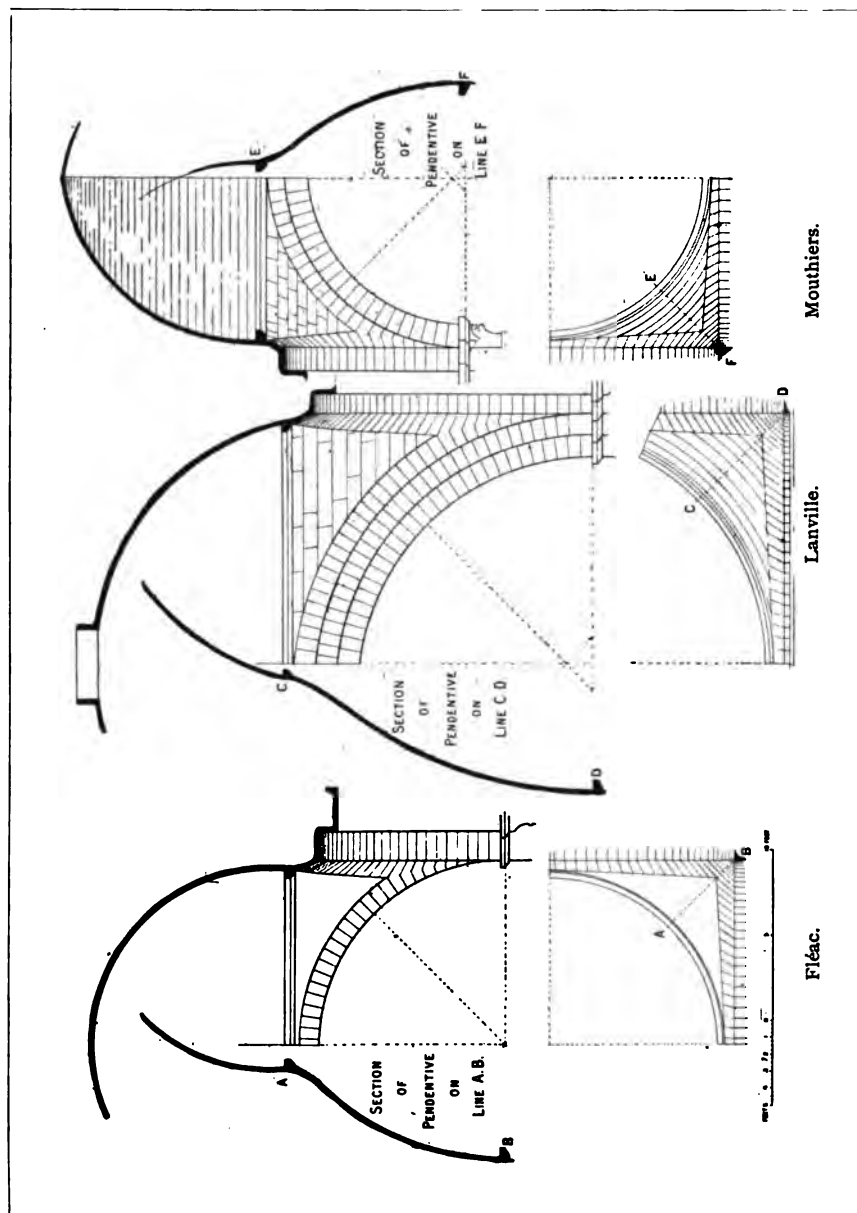
According to de Verneilh, the third dome of St. Stephen's was rebuilt in the second half of the twelfth century. Here the extra rib is found, and the whole is constructed in ashlar masonry. The domed churches of the Charenté have been so fully illustrated in the *Sharpe Memorial* that it is not necessary for me to do more than refer to that work. The churches were all built in the twelfth century, and therefore possess the extra rib. With the exception of Angoulême this rib is carried on a single shaft, and not on double shafts. Domes and barrel vaults are employed indiscriminately, as also the three methods of setting out the pendentives. Thus in Fléac,† Lanville, Mouthiers (Ill. 89), and in the second and third domes of Angoulême, the first method is adopted; in Gensac, Châtres, and Roulet, and possibly in the west dome of Angoulême, the second method; and in Trois-Palis, Saint-Quentin, Berneuil, Bourg-Charenté, Saint-Amand-de-Boixe, and Plassac, the third method.

The cathedral of Angoulême was consecrated in 1130. Consequently, if the date which I ascribe to the five-domed church of Saint-Front—viz., after the great fire of 1120—be correct, it follows that whilst the former was being completed, the latter may have been rising from the ashes of the old church. A comparison of the sculptured ornament at Angoulême [see headpiece, p. 233, in Vol. III. *Journal of the Royal Institute of British Architects*,

\* It is possible that this western dome constituted the original church, the design of which they desired to preserve.

† It is interesting to note that in Fléac the domes are carried on circular arches. Up to the level of the intrados of the keystone, therefore, the pendentive forms part of a sphere; above that, there is a curve back which suggests that in all those domes where the cupola above starts from the same line as the upper part of the pendentive they decided to continue the curve. Thus in the early dome of St. Stephen's, and the three domes of Charenté, viz., Fléac, Mouthiers, and Lanville (Ill. 89), the curve is continued. This is never found in Byzantine domes.





89.—THE LA CHARENTE PENDENTIVES. (From measurements by Mr. T. Garratt.)



3rd series] with that of Saint-Front would suggest even a later date for the latter. At Angoulême the details are much more influenced by Byzantine work. The nearest approach in the style of ornament which I find to that of La Charente is a capital in Saint-Michel d'Entraigues, 1137 A.D. (Ill. 80), and this is pure Romanesque work of similar character, *though earlier* than the work in Saint-Front.

The execution of the ashlar work in Angoulême and Saint-Front would seem to have been of the same quality, but in the design of the former we find the extra rib which was not employed in the latter. There is no doubt that in the absence of this rib which marked the development of the style in the twelfth century, and in the return to the huge square pier which characterised the domed churches of the eleventh century, we find two of the reasons which have inclined the advocates of the early date for Saint-Front to accept de Verneilh's theory. I have already pointed out, however, that in Solignac and Souillac, consecrated in 1143, the same characteristic existed, and we have also to take into account two important factors—firstly, the absolute *dissemblance* between the plans of Saint-Front and those of all the churches I have described, and including others in La Charente the plans of which are published in the *Sharpe Memorial*; and, secondly, the extraordinary *resemblance* in plan, design, and dimensions between the five-domed churches of Saint-Front and of St. Mark's, Venice. These are described in such detail by de Verneilh that there is no necessity for my entering further into them. There does not seem to me to be any doubt that the master-mason of Saint-Front went to Venice, measured the church of St. Mark's, and reproduced it, so far as the plan and general design were concerned. When it came to the execution of the pendentives and the domes, there was no reason to copy those; for more than a century domes had been built in France in a manner peculiar to the French masons, and if they returned to the early method of constructing pendentives as shown in St. Stephen's, and to the square piers, it was because they accorded better with the treatment of the walls as adopted in St. Mark's; they also lightened the piers by forming openings in them as in the same church. In the execution of the

decorative work in the capitals, corbels, &c., the Romanesque style being already fully developed in the South of France at that period, there was no necessity to bring over Byzantine artists to assist them in that direction. In fact, so high a value did they place on the artistic qualities of their own French sculptors that they seem to have avoided any of that distinct Byzantine influence—influence of that second period which is found in other French buildings, and notably through La Charente up to the close of the twelfth century. It is only necessary to look at the work of Angoulême, Saint-Amand-de-Boixe, Lanville, Roulet, Mouthiers, and other places to find that interlaced work and that v-section of leaves which suggest the lingering tradition of Byzantine influence; and by comparing it with the capitals, corbels, &c., of Saint-Front, to recognise at once that in the latter there is an entire absence of the same feeling, notwithstanding the singular fact that St. Mark's was the original model on which it was based.

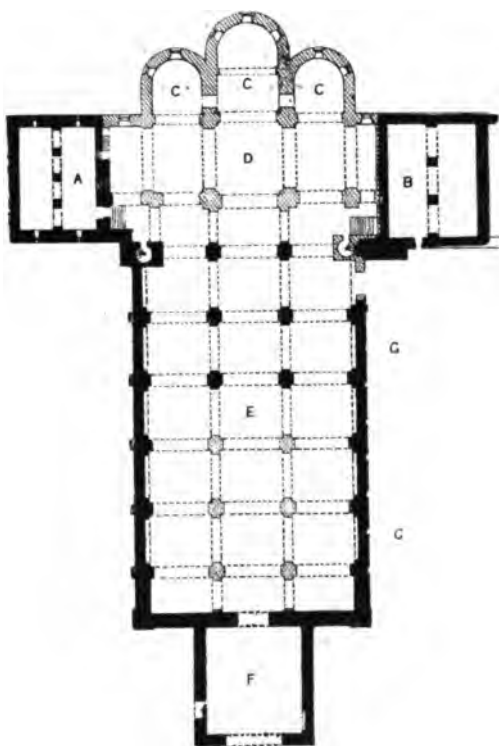
It was, in fact, this negative quality in Saint-Front which first led to my doubts about the date of the five-domed church. De Verneilh's book, and the Byzantine feeling shown at all events in the beautiful engravings which illustrate it, led me to suppose that in Saint-Front and the early churches of the Périgord I should find the more remarkable examples of the style. The evidence of the buildings themselves turned absolutely in the other direction, and so far from there being anything Byzantine either in the domed churches or in their decoration, they alone among all buildings in France of the eleventh and twelfth centuries possess no characteristic of that style. The French builders of the South of France have always had the credit of being the originators of the barrel vault, with its stone or tile roof, absolutely incombustible, lying direct on the vault; to them also I contend now we owe the development of the dome, with its pendentives set out in a manner peculiar to themselves, and in no way corresponding to those found in the East.

I have appended herewith a suggested restoration (Ill. 90) of the old church for two reasons: first, to show that a considerable portion of it still exists; and secondly, to point out where, in my opinion, the old bell tower was placed; because,

having suggested in my paper that the existing tower was not built till the twelfth century, over two bays of a nave built in the eleventh century, I am bound to show where the original tower containing the bells melted in the great fire might have been placed. As the piers of this tower were giving way, in the restoration carried out about 1880, it was underpinned and the defective piers rebuilt. M. Lambert was kind enough to make me a drawing showing the plans of the original piers before they were encased in the twelfth century, and I recognised at once a similar disposition to those at Vignory, where about 1030 they thickened the piers and vaulted the aisles of the two choir bays, as they did also at Saint-Front.

The confessionals, A and B, exist still, as also the room over B. The room over A has been

removed, displaying the richly decorated south wall, which has been restored, and is now an external feature. The aisle walls, west front, and porch all still exist, parts of the latter being hid in the houses overlooking the market place. The six piers of nave are now embedded in the tower. They are carefully described in de Verneilh's work, and I gathered



90.—RESTORED PLAN OF THE "VIEILLE ÉGLISE,"  
SAINT-FRONT.

A B, Confessionals. C, Apses. D, Tower. E, Nave.  
F, Porch. G, Cloisters.

from M. Lambert that in the restoration of the tower they were substantially as de Verneilh had described them. The responds of the pilasters on the north and south walls of the aisle gave me the position of the other piers of the nave, and I have assumed that the narrow bay was vaulted with an arch turned in the other direction, over the aisles, so as to resist the pressure of the series of barrel vaults thrown across the aisles, and at right angles to the nave. A similar requirement at the east end of the nave has suggested another narrow bay. This leaves room for a transept running between the two confessionals of the same width as the nave, and on the crossing I place the bell tower, this being a position often found in early churches. I may instance the churches of Germigny-les-Prés and Saint-Martin at Angers (819), both already referred to; Louans, in Touraine (1020); Querqueville and Saint-Saturnin, in Normandy, of the ninth and tenth centuries; and of later date, Saint-Savin, Cluny, and Tournus.

The triple apse is found in Sainte-Généroux (Deux-Sèvres), ninth century; Langeais, in Touraine; and in many churches in Italy from the end of the ninth century, so that it was a well-known and recognised feature. These apses at Saint-Front are said to have been built by Eyna, Countess of Périgord, in or about the year 1003. As will be seen on referring to the plan of the existing building, all the east end of the Latin chancel, as shown in the restoration, was taken down when the western dome was built, so that no traces of it have ever been found. I was informed by M. Lambert that originally the whole floor under the western dome was about 3 feet higher than the present level, which would suggest that for some religious reasons they preserved the floor of the old church—the five-domed church standing on a lower level. This pavement was lowered in 1580 by François de Bourdeille, Bishop of Périgueux, so that all traces of the original foundations were then removed.

In the sixteenth century a roof of timber was built over the whole church, as the rain penetrated the stone cupolas. This roof was set on fire by the Huguenots, and photographs in the possession of M. Lambert show the effects of the conflagration,

which he attributed to the fire of 1120; but as it was the outside and upper portions of the cupolas which suffered, the fire must have been external, *i.e.*, under the roofs.

In conclusion, it is known that the nave was covered by a timber roof; I have assumed that the transept would have a similar roof, and under the belfry, as in Germigny-les-Prés.\* The two sections show clearly that no dome ever existed in the tower. There might only have been a timber floor, so that it can well be understood that in the great and sudden conflagration of such a structure the bells in the tower might easily be melted.

I should not like to close this paper without expressing my warmest thanks to M. Lambert, the architect-inspector of the works at Saint-Front. Already in 1893 he was kind enough to send me valuable information; and last year, when in Périgueux, he allowed me to visit the church in all its parts; since then also I have, I am afraid, made his life a misery with my continual questions. My only regret is that the conclusions at which I have arrived as regards the date of Saint-Front are diametrically opposed to his own. I have also to express my thanks to M. Paul Bœswilwald for a tracing, with dimensions, of the domes and pendentives as reconstructed by Abadie, and for other information. I am indebted also to the late Edmund Sharpe for the two illustrations of the exterior and interior of Saint-Front (Ills. 69 and 70), taken from his own drawings, and made to illustrate his well-known lecture on the domed churches of La Charente, delivered in 1876.

Subsequent to the delivery of my paper I ascertained that records existed which proved that the bodies of the saints were not brought back till 1171, so that the new church may not have been commenced before about 1150, and therefore it was virtually the last domed church of any size built in France, instead of being the first, according to de Verneilh. It is an extraordinary fact that neither de Verneilh nor Gaucherel, who spent ten years in measuring the church and preparing the drawings, neglected

\* In the restoration carried out in 1865, the whole church was virtually rebuilt, and a dome carried on squinches was inserted under the belfry floor, partially masking the stucco decorations of the circular-headed windows. See César Daly, *Revue Générale de l'Architecture*, Vol. VIII., in which are two plates representing the church as measured in the forties by Constant Dufaux.

to note during that time the leaning over of the voussoirs of the great arches at the top, and represented them in the engraved plates as vertical.\* Viollet-le-Duc made the same mistake, and in the drawings he prepared for Gailhabaud he shows vertical voussoirs and other incorrect features; as already stated, he recognised his mistake on his second visit to Périgueux, and intended to revise them in a new edition of his *Dictionnaire raisonne*, which was never published.

\* Our friends who went to La Charente in 1875 and measured many of the pendentives noted at once this exceptional leaning over of the voussoirs and the winding forms of the pendentive. Mr. Garratt's outlines, set out on the spot to note thereon the dimensions, showed that at the first glance he had grasped the peculiar construction; in other words, Mr. Garratt saw in five minutes what de Verneilh had failed to recognise in ten years. The same remarks apply equally to the drawing made by de Vogué of the church of Ste. Anne in Jerusalem, published in his work, *Les églises de la Terre sainte*. Belonging to the second type, the voussoirs at the top were vertical in this case, but in the lower courses they, forming part of the pendentive, wind to the centre axis of same, but are not so shown in his work. M. Gosset, in his work, *Les coupôles de l'orient*, falls into the same error. In fact, the only persons who have failed to understand the peculiar and unique construction of the French Périgordian pendentives are the French artists who try to draw them!



NOTES ON SOME CHURCHES IN PALESTINE AND SICILY, being two communications to the Journal of the Royal Institute of British Architects sent subsequent to the reading of a paper by Mr. Archibald Dickie on *Early Christian Churches in Palestine*. Mr. Dickie's paper (read on March 6th, 1899,) and the two communications were published in the Royal Institute of British Architects' Journal, Vol. IV., 3rd series, Nos. 9 and 11, from which they are reprinted by permission. To these communications a Prefatory Note has been added by the Author.

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## SUMMARY.

PREFATORY NOTE ADDED IN ORDER TO DWELL UPON THE INTRODUCTION OF THE POINTED ARCH IN PALESTINE—AS EMPLOYED IN THE MOSQUE OF DAMASCUS—IN THE MOSQUE OF EL AKSAH, JERUSALEM—ITS EARLIEST DATE IN EGYPT—EARLY EXAMPLES IN SICILY—AND, FINALLY, AS EMPLOYED IN THE CRUSADERS' CHURCHES IN PALESTINE.

## FIRST COMMUNICATION.

REFERENCES TO THE CHURCH AT THE POOL OF SILOAM AND THE CHURCH OF ST. JOHN, JERUSALEM—IN WHICH ROUND ARCHES ARE GENERALLY EMPLOYED, AS ALSO IN THE CHURCH OF THE HOLY SEPULCHRE.

## SECOND COMMUNICATION.

WORK BY CHARLEMAGNE AND THE MONKS OF AMALFI—THE CRUSADERS' WORK AND ITS SPECIAL CHARACTERISTICS AS DISTINGUISHED FROM THAT FOUND IN PALESTINE PRIOR TO 1099—THE DOME OF STE. ANNE AND ITS CONSTRUCTION SIMILAR TO THAT OF THE PÉRIGORDIAN DOMES—THE HERODIAN AND CRUSADERS' MASONRY CONTRASTED.



## JERUSALEM CHURCHES.

### PREFATORY NOTE.

THE two letters which follow this Preface were published in the Royal Institute of British Architects' Journal subsequent to the reading of an interesting paper by Mr. Archibald Dickie, on March 6th, 1899, on *Some Early Churches in Palestine*. The two buildings referred to were the church at the Pool of Siloam, of which Mr. Dickie had made a conjectural restoration, and a church which he described as that of St. John, over which a modern church had been built. As these communications open the question relative to the source from which the pointed arch as used in the Crusaders' churches in Palestine was derived, a few words more might be added.

That the Byzantines, to whom the introduction of the pointed arch is attributed, were acquainted with the structural value of that feature is well known. In the mosque of the Omeiyades at Damascus (705—712 A.D.), the arches across the transept, which was built by workmen sent from Constantinople, are slightly pointed, but all the other arches, in the aisle arcades and of the windows, and those carrying the dome are semi-circular, which suggests that the pointed arch did not accord with the Byzantine system of design. In the mosque of El Aksah at Jerusalem, built by Abd-el-Malik about 691 A.D., the arches of the nave are 20 feet wide, and the distance between the centres 7 feet, so that the pointed arch (whoever may have been the masons employed, whether Syrian or Armenian) had become a marked and accentuated feature in Mahometan work. That Byzantine masons were not employed is shown in the capitals carrying these arches, which are clumsy attempts to imitate those copied from Justinian's church of St. Mary, on Mount Sion. In the older portion of the

mosque of Amr, in Old Cairo, are some pointed arches which may date from 643 A.D., but the earliest known existing examples are those in the Nilometer at Roda, which was rebuilt 861 A.D., replacing an older building (705—717 A.D.) which was washed away. In the mosque of Ibn-Tooloon (879 A.D.) the pointed arch exists throughout, which shows that it had then been accepted as a typical form by the Mahometans. From Egypt



91.—THE ADMIRAL'S BRIDGE, OUTSIDE PALERMO.

the feature passed to Sicily, and, as I think, partly from there and partly from the South of France (where it had been employed from the beginning of the eleventh century), it was taken back to Syria by the Crusaders. As proofs of its earlier date in Sicily, I am able to give reproductions of two photographs, one of which has only just reached me. The first is that of the Ponte dell' Ammiraglio, outside Palermo, dating from 1113 A.D. (Ill. 91). The second is that of the interior of the dome of the most ancient church in Sicily, which lies a short distance beyond the bridge just spoken of,

viz., St. Giovanni dei Leprosi, built in 1072 A.D. (Ill. 92). This photograph shows also the earliest example of the squinch adopted in Palermo to carry a circular dome above the square crossing, a method Byzantine in its origin, and of which an early type is found in the squinch carrying the dome in the mosque of Damascus (see Ill. 98). In later buildings, such as in the church of S. Giovanni degli Eremiti, built about 1132 A.D., and that of La Martorana, built 1143, the squinches in the angles, which have pointed arches of two orders, and a niche, bear a certain resemblance, although on a much larger scale, to the stalactite niches of Cairo. In both cases the arches are pointed, and of two orders, the



92.—SAN GIOVANNI DEI LEPROSI, PALERMO, SICILY.

lower one set slightly back behind the upper order. This slight set-back is the chief characteristic of the nave arcades of the Crusaders' churches in Syria, which in that respect differ from all European examples, where, as a rule, the set-back is equal to the height of the voussoir. The interior of the church of Abu-Gosh, near Jerusalem, built about 1140 (Ill. 93), may be taken as an example. In the second communication reference is made to two churches at Byblos and Beyrout (1120—1130 A.D.), the naves of which are covered by pointed barrel vaults with transverse ribs. There is a third example at Tortosa, of which we publish a view in Ill. 94. This church is attributed to the same date.

EXTRACTS FROM THE JOURNAL OF THE ROYAL INSTITUTE  
OF BRITISH ARCHITECTS :—

In Mr. Dickie's restoration of the church at the Pool of Siloam, he shows on the north side a small chamber which he calls a chapel. As in the Greek church there is only one chapel and one altar, the chamber in question was probably a recess set apart for the reception of the offerings of the faithful. In all the early Syrian churches, on either side of the choir are small chambers, generally with apsidal terminations. The one which



93.—CRUSADERS' CHURCH OF ABU-GOSH, NEAR JERUSALEM.

is nearest to the main approach (sometimes on the north and sometimes on the south side) is the room for the offerings, which is screened off from the church only by a low enclosure screen similar to that shown on Mr. Dickie's plan. The other chamber on the south side contained the table on which the sacred elements were placed, and was entered by the priest only. These chambers do not serve the purpose of the prothesis and diaconicon, which for the purposes of the improved Greek ritual were not introduced in the Greek churches till the time of Justin II.

Mr. Dickie informs us that the small triapsal church was

now surmounted by a modern church, to which he gave no name. If this triapsal church lies under a portion of the church of Ste. Mary the Great, just restored for the German Emperor, may it not have been the church of St. Mary the Less, which was built by the monks of Amalfi about 1040? It does not seem to have been of sufficient importance to be the church of St. John, which was built on the west side, I think, of the church of Ste. Mary the Great.

As all the churches in Jerusalem were razed to the ground in 1010 by the Mad Khalif, El-Hakim, and thirty years afterwards two churches were built on this site, it may fairly be supposed that the example illustrated in Mr. Dickie's drawings is one of those, and is valuable therefore as showing the style of building erected in Jerusalem before the occupation of that city by the Crusaders. If so, it shows that the arches employed in doors and windows were all semicircular, and not pointed. Further, in the church of the Holy Sepulchre, the rotunda, built by Monomachus, was shown by Willis, in a drawing made by Bernardino, to have had semicircular arches throughout in its design. It follows, therefore, that the pointed arch was not necessarily current in Syrian work prior to the Crusades. In a future letter I shall endeavour to prove the error of that long-cherished belief that pointed architecture was brought from the East by the Crusaders. It was introduced from Europe into Syria, and Mr. Dickie's remark "that the strong Provençal smack" about the church of the Holy Sepulchre "betrays the inspiration of its design" is quite in accord with my recollection of the church, and of its ornamental and constructive details.

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In continuation of my first communication, it is unfortunate that so few remains exist of the churches erected in Jerusalem by Charlemagne in the ninth century and by the monks of Amalfi in the eleventh century, as they might have enabled us to judge of the architectural development in Syria prior to the Crusades. In both these cases it is probable that native workmen were employed, who carried out the plans furnished to them, according to the customs of the country, of which Mr. Dickie has given us a description; but whether the

pointed vault as shown in Mr. Dickie's drawing was introduced from Amalfi or was current in the country there is no evidence to show. When, however, we come to the lofty vaulted churches which the Crusaders introduced it is impossible not to recognise that the work was not only set out but carried into execution by French and Italian master-masons, and masons' marks of both these countries are found; curiously enough, none are found of either English or German masons, though in some of the Crusading castles, and notably in the castle of Belfort, there are Early-English mouldings. The nearest approach in design and style to the Crusaders' churches are those which are found in South Italy and Sicily; and, as the early Christian work in Sicily was built for the Normans by the native workmen, with whom still rested the tradition of the Saracenic work of two and a half centuries (evidenced by the Zisa Palace and the Cappella Palatina, where perfect stalactitic vaulting and Saracenic ornament are found), it is probable that from Sicily may have been obtained a considerable portion of the labour utilised by the Crusaders in Syria. This is further suggested by the fact that at this epoch Arabic and Greek were the current languages in Sicily, so that they would be able to work in unison with the Armenian and other Christian workmen in Syria.

The two earliest Crusaders' churches in Syria are those of Byblos and Beyrout (1120—1130 A.D.), and in both these cases the naves are covered with *pointed barrel vaults* with transverse ribs, identical with the vaults of the church at Carcassonne and other examples in Provence; and, as Carcassonne dates from 1096, whereas the two churches above mentioned are at least twenty years later, it is probable that they were erected by master-masons from the South of France and under the supervision of the monks of Cluny. De Vogué suggests that in these cases they had not attempted to utilise the labour of the country, which accounts for the introduction of this essentially French feature. They adopted, however, the triapsal arrangement for the east end with apses, circular inside and polygonal outside, of which so many Byzantine examples still exist.

At a later period, from 1140, the naves of the churches were vaulted with intersecting groined vaults and transverse ribs, the



vaults all being built on regular centering with masonry of large dimensions, and always in horizontal courses and with a



*Photo by Prof. van Berchem.*

94.—CRUSADERS' CHURCH AT TORTOSA, LOOKING EAST.

horizontal ridge. This is more Sicilian than French, and it might have been a local method except for the fact that very few of the earlier Byzantine churches, so far as I know, were ever vaulted. It is true that large numbers of those in Jerusalem

were destroyed by the Mad Khalif El-Hakim in 1010, but there are, perhaps, a dozen examples in Syria of which the plans are known, and in which the columns there shown could not have supported a vault. That the Crusaders were acquainted with these churches is evidenced by the fact that they adopted almost universally the triapsal design of the east end with polygonal exteriors to the apses. The ground plan of these churches consists of nave and aisles (which were nearly of the same width), of three or four bays, a transept with the groining covered by a dome or pendentives, and the triapsal east end.

The sectional outline and the construction of these domes with pendentives carried on pointed arches are derived from those built in the South of France, in Périgord and Angoumois, which I described in detail in my paper on "Saint-Front and the Domed Churches of Périgord and the Charente," and in which I drew attention to the fact that the pendentives were set out on the intrados of the arch, such as is not found in Eastern domes, where they are always set out on the extrados.

The three examples from Fléac, Lanville, and Mouthiers (Ill. 89), if compared with the dome and pendentive of the church of Ste. Anne at Jerusalem (Ill. 95), will show the resemblance I refer to in the setting out. It becomes, therefore, a question of date, and, as those in France were developed from the *commencement of the eleventh century*, and the earliest Crusading domes in Syria are not placed earlier than 1140, it follows that they were introduced by the French into that country. The chief dates of those in France are St. Stephen, Périgueux, west dome 1013, central dome 1030; St. Jean de Cole, about 1086; St. Avit Senieur, end of eleventh century; Fontevrault nave, 1101—1119; Cahors, 1119; Angoulême, west dome, 1120. The dates of Fléac, Lanville, and Mouthiers are not known, but they carry on the traditional method of building the pendentives. The return curve of the pendentive to which I refer in my paper on Saint-Front (p. 181) is most clearly shown in the reproduction of the dome of Ste. Anne.

The pendentives of these domes were all built in horizontal courses, and the cupolas above are all built on regular centering. This is not the Eastern method of building domes; the only example known in Syria is that of Ezra, a lofty conical dome

built without centering (see De Vogué's *Syrie Centrale*, plate 21).

There are one or two other special characteristics in these Crusading churches.



95.—EAST END OF CRUSADERS' CHURCH OF STE. ANNE, JERUSALEM.

1. The roofs are all flat, and covered with stone slabs or cement laid direct on the vault.
  2. With two or three exceptions the arches are all pointed, and have a central keystone.
  3. When in the nave arches there are two orders, the set-back
- S.T. P

of the inner order is very slight, and in the earlier examples the arches are not moulded (Ill. 93).

These two latter characteristics are in accord with the churches in Sicily built by the Normans at the end of the eleventh century and the first forty years of the twelfth century.

The features which are distinctly Syrian in character, viz., the polygonal apses and the flat roofs on the nave and aisles, are precisely those which were never introduced into Europe, while nearly all the others can be traced to French, Italian, Sicilian, or English sources.

There are, however, instances, in which a distinctly Byzantine character is recognisable in the carving, much more marked than that which existed in France at the same period; and this is seen in the strongly-developed hood mould round the arches of the south front of the Holy Sepulchre and the continuation of this hood mould as a string. On the other hand the cushion voussoirs of the two main portals of the south front, and the west portal of the Holy Sepulchre, and in two or three other Crusading churches, were probably introduced from Sicily, where it is found in the tower of the Martorana in Palermo, dating from the commencement of the twelfth century. The other sculpture on the portals above mentioned is clearly French work, such as is found throughout Provence.

There is one other characteristic in the Crusaders' work, but chiefly confined to the castles, and that is in the diagonal dressing of the stone. As with the Herodian masonry, there is always a draft of 3 or 4 inches round the margin of each block (Ill. 96); the dressing of the centre is done with a pick, vertically in Herodian work, and diagonally in Crusaders' work. The castle of Banias was always thought to have been Herodian until Renan noticed the diagonal dressing.



*Photo by Prof. Max van Berchem.*

96.—THE CASTLE AT TORTOSA, BUILT BY THE CRUSADERS.



# THE GREAT MOSQUE OF THE OMEIYADES, DAMASCUS.

AN HISTORICAL ACCOUNT PUBLISHED IN  
THE ARCHITECTURAL REVIEW, VOL. VIII.,  
FROM WHICH IT IS BY PERMISSION  
REPRINTED.

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## SUMMARY.

THE EARLY HISTORY OF THE MOSQUE ACCORDING TO THE MEDIÆVAL ARAB GEOGRAPHERS—THE PROBABLE DATES OF THE WORK ATTRIBUTED TO THE SELEUCIDÆ AND THAT CARRIED OUT BY THE ROMANS PRIOR TO THE CONVERSION OF THE TEMPLE INTO A CHRISTIAN CHURCH BY THEODOSIUS, 379 A.D.—THE TRANSFORMATION INTO THE GREAT MOSQUE AND REBUILDING OF THE SAME BY THE KHALIF AL WALĪD IN 705–713 A.D.—ITS PARTIAL DESTRUCTION BY FIRE AND SUBSEQUENT RESTORATION IN 1069, 1400, AND 1893 A.D.—DESCRIPTION OF THE MOSQUE IN DETAIL, THE REMAINS OF THE SYRO-GREEK AND ROMAN WORK FORMING THE TEMPLE, ITS ENCLOSURES AND PROPYLÆA—THE KHALIF AL WALĪD'S WORK AND ITS DESCRIPTION BY MUKADASSI (985 A.D.)—ITS CONDITION IN 1184 SUBSEQUENT TO THE RESTORATION AFTER THE FIRE IN 1069 A.D. AS DESCRIBED BY IBN-JUBAIR—THE REDECORATION OF THE INTERIOR IN THE THIRTEENTH AND FOURTEENTH CENTURIES—THE SUBSTITUTION OF HIGH-PITCHED ROOFS AFTER THE FIRE OF 1400 IN THE PLACE OF THE FLAT ROOFS MENTIONED BY IBN-JUBAIR AND OTHER RESTORATIONS AT VARIOUS TIMES REVEALED BY ITS PARTIAL DESTRUCTION BY FIRE ON THE 14<sup>TH</sup> OCTOBER, 1893—THE PRESENT CONDITION OF THE MOSQUE AND ITS PARTIAL RESTORATION.





## THE GREAT MOSQUE AT DAMASCUS.

THE visit of the German Emperor to the Holy Land in 1900 tended to revive the interest which had, since the foundation of the Palestine Exploration Fund, been taken in the history and architecture of the numerous remains of classic Byzantine and Mahometan buildings of that country, but which, for the time had, since our occupation of Egypt, waned somewhat, owing to the more active researches pursued there. The accounts transmitted to the various journals were necessarily somewhat curtailed owing to the rapid progress made by the Emperor, and the fact that, owing to the obtuseness of some of the Turkish authorities the correspondents were not always able to follow in the *cortège* of his Imperial Majesty. It is stated, however, that the Emperor decided to write an account himself of his journey to the Holy Land, and that it is to be published and given to the public. It will not only be an account of the tour, but will give the Emperor's impressions in Turkey, as well as in Palestine. The great mosque of Damascus, which might have figured as one of the most sumptuous buildings visited, had the journey been made five years ago, must have presented but a poor appearance in 1900, for, although the restorations were commenced shortly after the disastrous fire of 1893, very little progress would seem to have been made, owing, firstly, to the fact that many of the walls required very substantial repairs, and the central dome had suffered so much that it was found necessary to take it down; and, secondly, that all the columns for the great nave have had to be specially quarried and turned for the purpose, there being no available ancient materials to be used up, as was the case when the mosque was built, and in the subsequent restorations after the fire of 1069. Mr. Guy-le-Strange, in his work, *Palestine under the Moslems: a description of Syria and the Holy Land from A.D. 650 to 1500*, translated from

*the works of the Medieval Arab Geographers*, and published for the Palestine Exploration Fund, informs us that "in the ninth century the science of geography had already begun to be studied by the learned of Islam. The science, besides being theoretically expounded in their schools, was practically treated of in the numerous Arab 'Road Books,' since the pilgrimage to Mecca made every Moslem perforce a traveller once at least during the course of his life." The diaries of some of these contain the most graphic descriptions of the Holy City and Damascus; and, moreover, these Arab geographers would seem to have been much better acquainted with architectural, and even technical terms, than the greater number of the lay writers of the present day. There is a tendency sometimes in these diaries to exaggerate the architectural splendour of the buildings of their own religion; but, by comparison one with the other, we are able to form a fairly accurate, though conjectural, restoration from their descriptions; a restoration which, so far as the mosque of Damascus is concerned, is rendered more easy by the preservation of the building itself, or at least of the more substantial portions of it, and also by the circumstance, otherwise to be deeply deplored, that the great fire of 1893 exposed parts of the building hitherto masked by bazaars outside, and by subsequent restorations of the main roof. For our purpose their writings have this special value—they describe the building as they saw it; we are able, therefore, to follow the extent and the design of the original mosque, and the changes which took place after the first great fire in 1069. The building itself, as it existed before the fire of 1893, shows the alterations and restorations after the fire of 1400, and the photographs taken since the fire of 1893 show its actual condition. The Arab geographers, however, were not archaeologists, as we understand the term at the present day, and the Eastern buildings of the Syro-Greek and Roman periods are by them attributed to much more ancient dates, and are ascribed to the earlier founders of Damascus. The propylæa of the Jairun Gate, for instance, with the thirty columns, which once existed, is assumed to have been a palace, and is called "Iram dhât al Amud," or "Iram of the Columns," and to have been built by Jairun, the great-grandson of Shem. The inner temple

is supposed to have been built by the Sabeans, or fire-worshippers; the towers were built by the Greeks (meaning the Christian Greeks), and so on. When they describe the mosque, however, a building of their own time, and built for the purposes and the rites of their own religion, their descriptions, some of which we shall give at length, are of a most detailed and accurate nature.

Damascus is one of the oldest cities in Syria; it was already celebrated in the time of Abraham, and is frequently mentioned in Holy Writ. The earliest building of which remains exist dates probably from a little over a century before the Christian era, and may possibly be ascribed to Antiochus Cyzicenus, who, in 114 B.C., divided the kingdom of Syria with his brother, Antiochus Grypus, and selected Damascus as his capital. Antiochus Grypus made Antioch his capital, and the rivalry of the two brothers may have led to the creation of palatial buildings in both towns. The supremacy of the Seleucidæ family, to which Cyzicenus belonged, came to an end in 65 B.C., when Damascus passed under the Roman Empire. More than a century and a half passed, however, before the Romans began to build in Syria. During the reign of Trajan, A.D. 98—118, Damascus became a Roman provincial city, and Apollodorus of Damascus, the most celebrated architect of his time, who built the Trajan forum at Rome, including the celebrated column, may have erected the famous archway of Bab-el-Berid. To the peaceful reign of the Antonines (138—180), who followed, we owe the principal temples at Baalbek, Gerasa, Palmyra, and other Syrian cities, and possibly the temple at Damascus, of which the entrance front, with its great doorway, forms portion of the south wall of the great mosque. Some years after the accession of Constantine, and when Christianity became, in A.D. 323, the established religion, Damascus was constituted an episcopal centre with fifteen dioceses. The temple is said to have been converted into a church by Theodosius in 379 A.D., and, according to Mr. Porter,\* a stone was found near the Jairun gate with an inscription stating, "This church of the blessed John the Baptist was restored by Arcadius, the son of

\* *Five Years in Damascus.* By Rev. J. L. Porter. 1855.

Theodosius." Arcadius is said not only to have restored the church, but to have enlarged it, to what extent we shall note further on. At all events, on the taking of Damascus in 634 A.D. by the Moslems, the church was sufficiently large to be divided into two parts, the Moslems taking the eastern half, and the Christians retaining only the western half, both entering, however, by the same great doorway to which we have already referred.

The reason for this division is given by Mr. Guy-le-Strange : "The western and eastern gates were besieged at the same time. The western capitulated to one of the generals, the eastern was taken by storm ; the city, therefore, was treated as one that had in part capitulated, and in part been taken by storm, and in consequence, during the first few years of the Arab dominion, the western part of the great church of St. John was left to the Christians, and the Moslems turned the eastern half into a mosque." In 705 A.D. the Khalif al Walid took possession of the whole church, which he pulled down, and then erected a mosque on the site, retaining, however, portions of the outer walls, which we shall note in detail later on ; he also built a great court on the north side, enclosed with lofty arcades and the north minaret called the Mâdinet el Arub.

In 750 the Omeiyade dynasty was overthrown by the Abasides, and towards the end of the century the capital of Islam was transferred to Bagdad. The town retained still, however, its prosperity, and the great mosque remained intact till 1069, when a fire destroyed portions of it. These were subsequently restored, but in 1400 a far greater destruction took place at the hands of Tamerlane, who is said to have deliberately set fire to it. A second restoration took place, and in the following centuries some alterations were made, most of which we shall be able to trace. In 1516 A.D. Syria was taken by Sultan Selim, of Constantinople, and it has remained since in the hands of the Ottoman Turks.

On October 14th, 1893, the proverbial plumber was at work repairing the leaden roof, and was indulging in a quiet pipe, when some of the well-lighted tombak from his narghile blew off unobserved into the exposed portion of the woodwork and set fire to it. As for close upon five centuries the massive





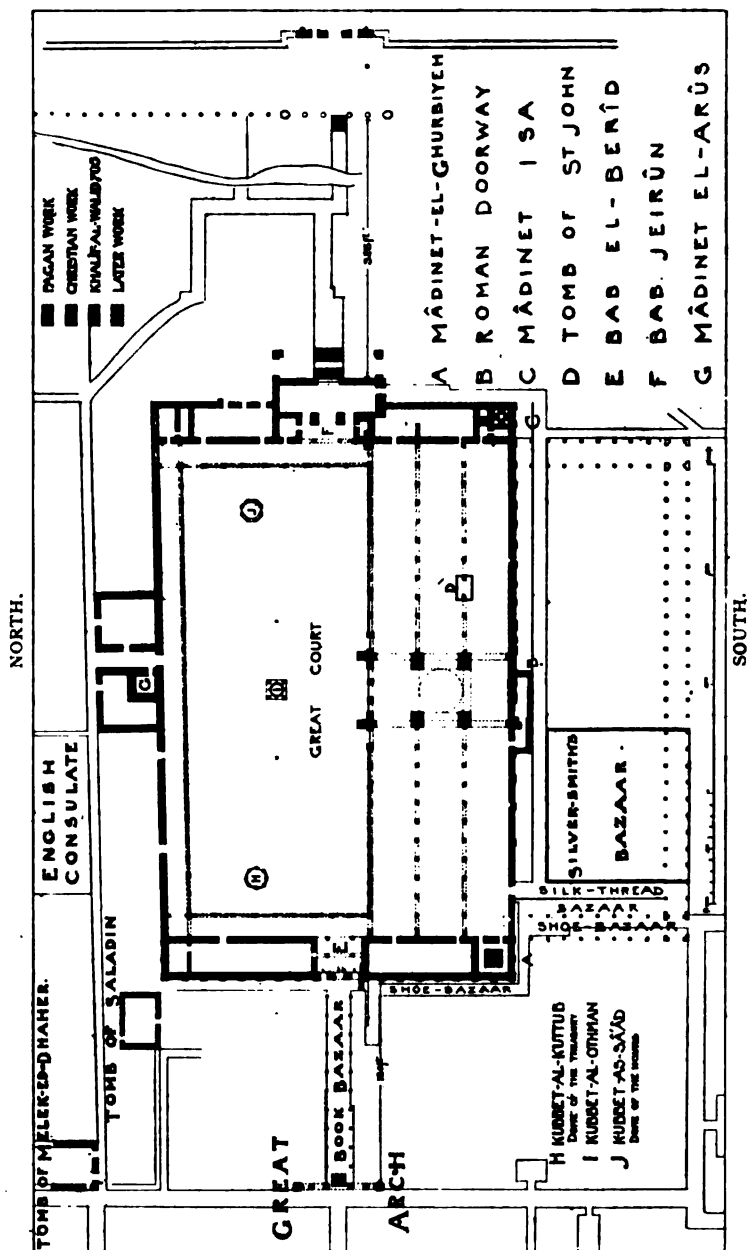
97.—MOSQUE OF DAMASCUS, VIEW OF SOUTH FRONT FROM THE SOUTH-EAST.

beams of this roof, covered only by sheets of lead, had been exposed to the fierce heat of a Syrian sun, it must have become more like touchwood than anything else, and in a few minutes clouds of smoke and flames burst forth. There was no means of arresting the fire, and in an incredibly short space of time the combustible portion of the whole mosque and the bazaars which surrounded it were reduced to ashes. Looking upon the destruction of the mosque as a great disaster to Islam, the Turkish authorities prohibited any mention of it in the papers, and it was not till December 2nd, 1893, that some account, with illustrations, appeared in the *Graphic*.

Before proceeding to trace the history of the great mosque and of the earlier buildings which are incorporated in it, it will render the subject more intelligible if it is prefaced with a description of the actual buildings as they existed before the fire.

The main building of the mosque runs nearly due east and west (see plan, Ill. 99, and general view, Ill. 97), and is built in between the two substructures which carry the minarets at the south-east and south-west corners respectively. It measures, internally, about 455 feet by 123 feet. Exactly in the centre is an immense transept running north and south, with a dome over the crossing. The great piers of the transept measure 13 feet by 10 feet; they are not, however, equidistant, being 32 feet apart from north to south, and 39 feet 6 inches from east to west. The transverse arches on the north and south sides of crossing are set back 3 feet 9 inches, so as to obtain above a perfect square of 39 feet 6 inches. The angles of this square are vaulted over with squinch pendentives (see view, Ill. 98). The drum carrying the dome above this is set back 2 feet behind the octagon thus formed, and by corbelling out, a gallery about 4 feet wide is carried round. There is a range of windows in the drum, and a second range in the dome, which is built of stone and covered with lead. The decoration in the dome is a restoration of the beginning of last century and very crude in colour.

The north and south transepts are covered over with flat ceilings, carried on immense beams, supported on corbels (Ill. 100), all richly carved, painted and gilded. The transept is



99.—PLAN OF THE MOSQUE OF DAMASCUS, INCLUDING THE EAST AND WEST PROPYLÆA OF THE ROMAN TEMPLE ENCLOSURE.

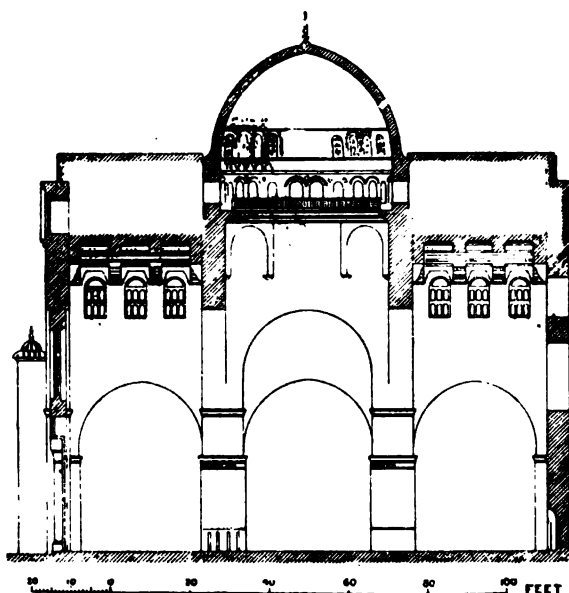




98.—VIEW OF TRANSEPT LOOKING NORTH.  
(From a water-colour drawing made by R. Phené Spiers in 1866.)



lighted by the windows in the dome, by a range of windows over the triple arcade (Ill. 101) which forms the principal entrance to the mosque from the court; on the south side by two ranges of windows over the mihrab (Ill. 104), by windows (Ill. 99) in the east (Ill. 102) and west walls of the north and south transepts, all of which range with the upper row of windows in the south transept, and were partially blocked up



100.—SECTION THROUGH TRANSEPTS, LOOKING EAST.

by the high-pitched roofs over the north and south aisles, and by other windows in north and south aisles.

On the east and west sides of the great transept are three aisles of equal width, and 185 feet long (Ill. 101). These aisles are divided by an arcade of eleven bays, carried on columns (Ill. 108), taken from some more ancient edifice, raised on pedestals, and surmounted by ancient Corinthian capitals and by dossierets.\* Above the arcades the walls are pierced with

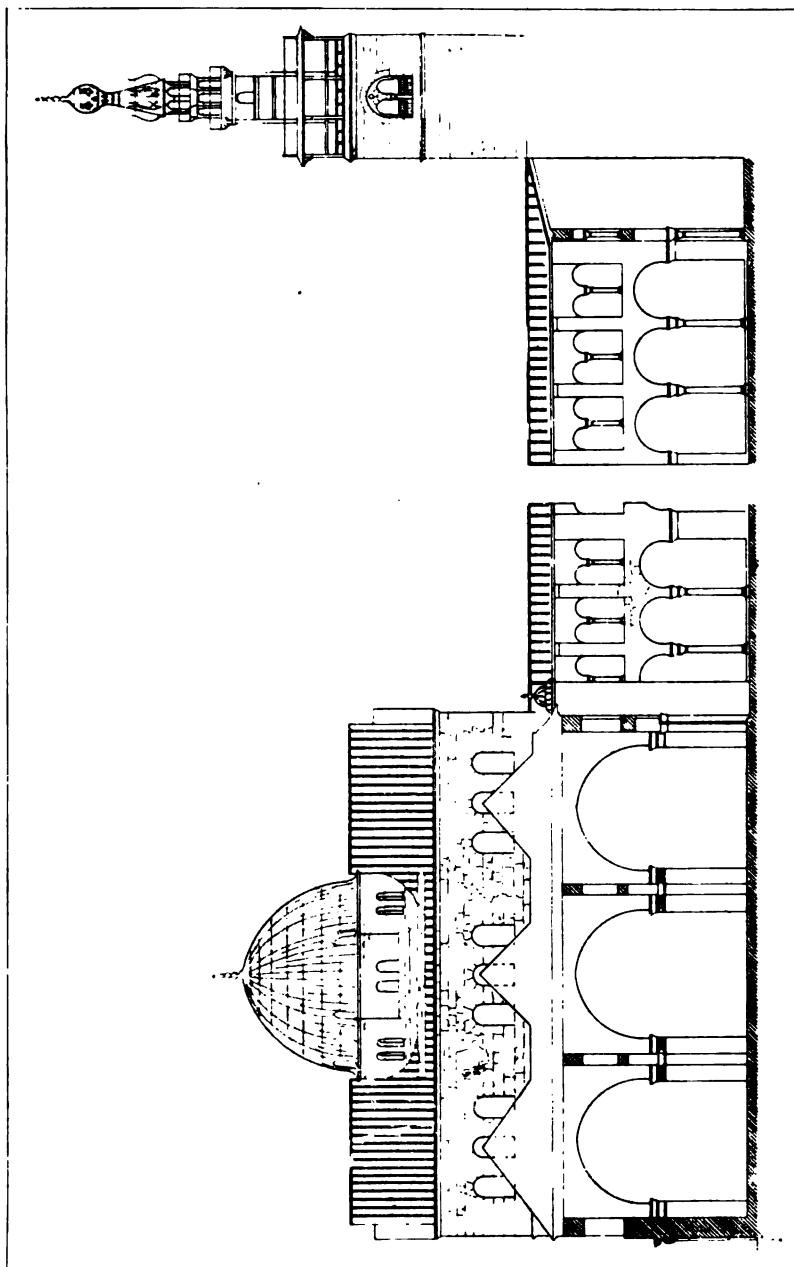
\* The dossieret is of Byzantine origin, and consists of a cubical block placed above the capital to carry a wall of greater thickness than the diameter of the columns.

semicircular arched openings, two to each bay of arcade. These open out into the side aisles (Ill. 108), which are of the same height as the central aisle, their object being to obtain



101.—VIEW OF THE NORTH FRONT, SHOWING ENTRANCE.

greater height in the structure than the columns taken from other buildings afforded. These triple aisles on each side of the transept were roofed over in the fifteenth century with high-pitched roofs covered with lead (Ills. 97 and 102). The trusses of these high-pitched open timber roofs were placed closer than



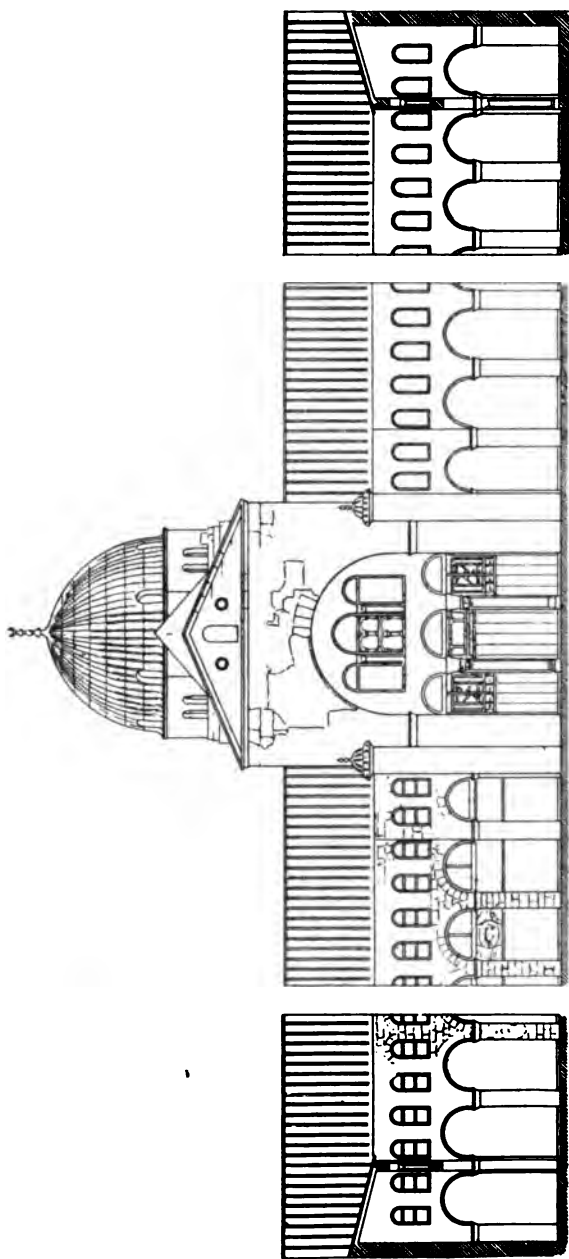
102.—SECTION ACROSS MOSQUE THROUGH COURT AND SHOWING NORTH MINARET.

usual in most roofs, viz., 8 feet 3 inches centre to centre, and, as the tie-beams measured about 26 inches by 20 inches, not much of the open roof was visible (Ill. 110). The north and south aisles are lighted by a range of windows in the north (Ill. 103) and south (Ill. 104) fronts on the same level, and of the same size as the semicircular arched openings above referred to, above the aisle arcades. Under these windows on the north side is a range of arcades, with some semicircular, some slightly pointed, arches corresponding in number and axis with those of the nave arcade. These arcades were described originally as being carried on columns; these have since either been encased, or, to judge by the stone courses, replaced by piers. The inclemency of the weather in Syria possibly called for this change, because in Egypt and at Kairwan and Cordova the mosque lies open to the court. These arcades had doors in the lower part, and windows above (Ill. 103), and the same applies to the triple arcade giving entrance to the transept. All of the windows in the mosque, including the tympana of the arcades, on north side, are, or rather were, fitted with pierced Arabesque designs in stucco (Ill. 98), filled with coloured glass. These windows are known in the East as "kamariyas" or "shemsiyas," of which there many examples from Cairo in the South Kensington Museum. Of the internal decoration of the mosque we shall speak later on.

On the north side of the mosque is a court of the same length, 190 feet deep from the transept wall to the rear wall of the arcade at the east end, and 180 feet at the west end. This court is surrounded by an arcade, the design of which is similar to the arcade and superstructure within the mosque, except that the columns\* are alternated with piers irregularly, there being sometimes three, sometimes two columns between the piers, and in three cases, opposite doorways in rear wall, the piers come together. The arched openings alone are, however, coupled together with a shaft in the centre. They all open into the great portico, the roof of which is constructed of beams exposed to view, and painted and decorated.

Externally, the mosque is of the simplest design. The walls

\* Many of the columns have, since their erection, been encased, some within the last century.

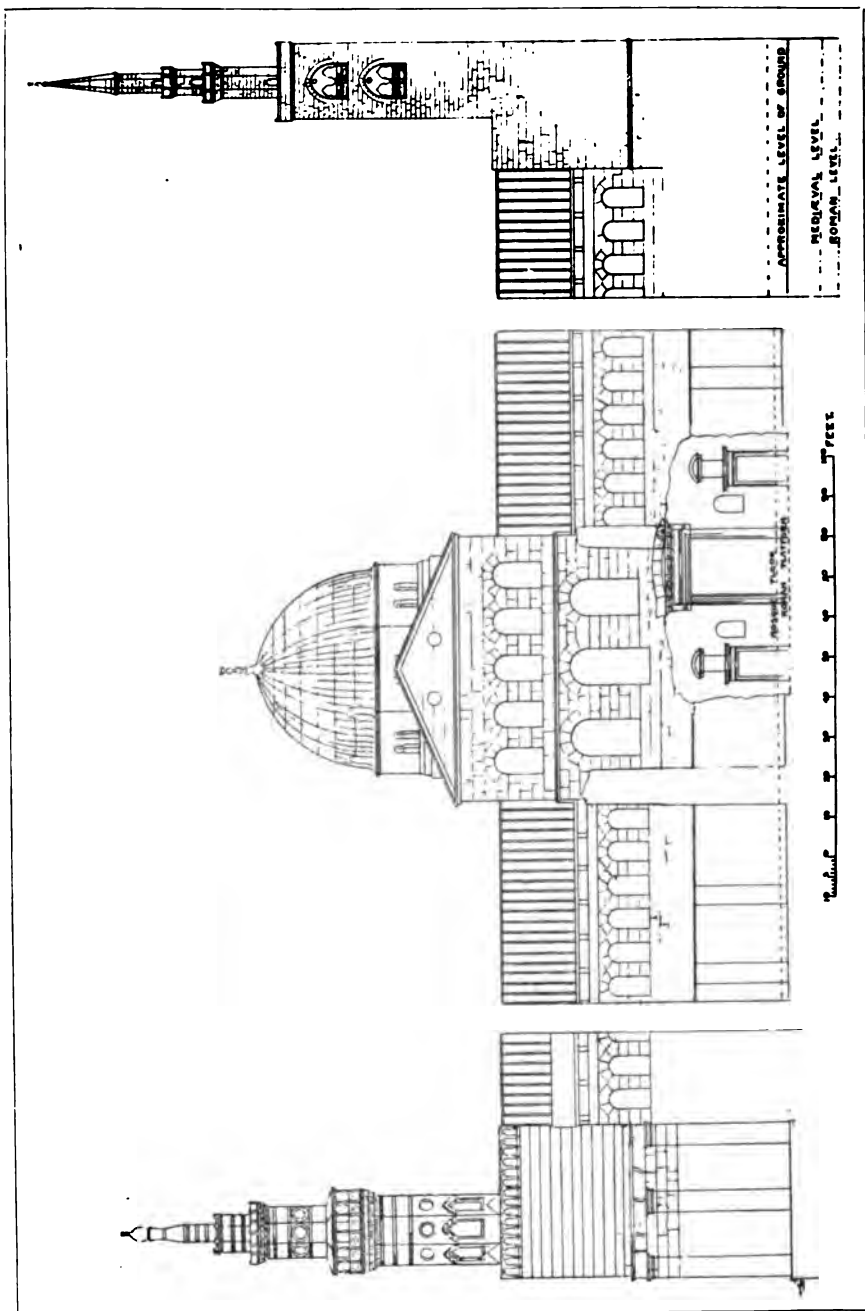


103.—CENTRE AND END OF FRONT TO GREAT COURT.

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104.—CENTRE AND TWO ENDS OF THE SOUTH FRONT.

are all built in ashlar masonry, with stone courses about 2 feet 9 inches in height, the windows are all circular-headed, with from five to seven voussoirs, according to the size. The transept rises 30 feet above the walls of the two wings, and has a low-pitched gable at the north and south ends, with a single bold ogee cornice, which is carried along the east and west fronts (Ills. 102, 103, and 104). The north side of the wall of the portico of the court is of inferior execution. These remarks refer to the masonry of the mosque, as built by the Khalif al Walid. To that of the earlier structure we shall refer later on.

On the north side of the mosque is the oldest minaret (Ill. 102), said to have been built by the Khalif al Walid, but probably restored since. It is square, with a covered gallery round the central minaret. At the south-east and south-west angles of the mosque, and carried on more ancient substructures, are two Saracenic minarets (Ill. 104), the former, known as the Mâdinet Isa (the minaret of Jesus), 259 feet high, consists of a square tower, and small octagonal minaret above in three storeys with platform round it. The other, octagonal, in four storeys, known as the Mâdinet El Ghurbiyeh (the western minaret) is of the same type as those found in Cairo, and in fact was built by the Sultan Kaït Bey of Egypt in 1483 A.D.

In describing the various buildings which constitute the whole mosque and its approaches, and endeavouring to trace their history and dates, we have been guided chiefly by Porter's work already referred to, to the accounts given by Mukadassi, 985 A.D., and Ibn-Jubair, 1185 A.D., translated in Mr. Guy-le-Strange's work, to Sir Charles Wilson's plan, published in Fergusson, and revised by Mr. Dickie (the architect of the Palestine Exploration Fund, from the plan given him by Mr. Apery, the architect of the restoration), who was sent to Damascus in February, 1897, to continue the researches made by the writer of this article, to Professor Van Berchem, of Geneva, for photographs and dates of Saracenic buildings, and to Mr. H. Kay, Dr. W. Wright, and Dr. Masterman.

The earliest building on the site is the porticus (Ill. 105), which now forms the western enclosure wall of the mosque and its precincts, 314 feet long, with returns 34 feet deep on the

north and south sides. With the exception of a break of about 35 feet in the centre of west wall, filled with the triple archway built by the Khalifal Walid (Ill. 99, E), it still remains more or less intact, except that the architrave and cornice only are preserved under the superstructure of the south-west minaret. Beyond the fact that it is pre-Roman, and belongs to that type of Syro-Greek work which is found throughout Palestine, it is

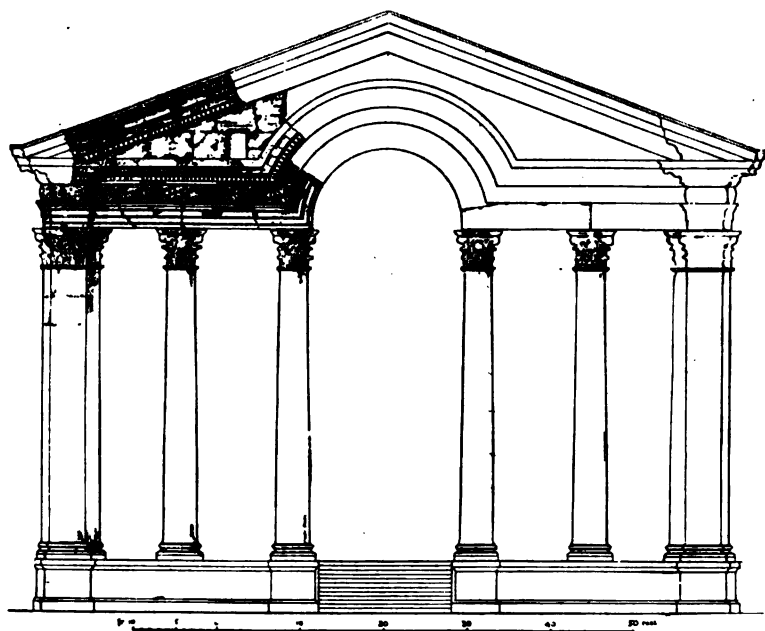


105.—THE SOUTH-WEST CORNER OF THE MOSQUE OF DAMASCUS, THE EARLIEST WORK FOUND.

impossible to fix a date for it, and we have assumed that it may have been erected by Antiochus Cyzicenus, because he seems to have been the first of the Seleucidæ to make Damascus his capital, and is likely, therefore, to have carried out these important works there, especially as his brother Grypus was exerting himself to make his capital Antioch a rival town. The wall surface of this porticus is decorated or broken up with pilasters, 34 feet 10 inches high, 5 feet to 5 feet 6 inches wide, projecting from 7 inches to 9 inches, and carried on a plain

plinth which projects 6 inches in front of pilaster, the interspaces averaging 11 feet 3 inches.

On the west front there are nine pilasters on each side of the triple gateway, and three pilasters on the returns, in both cases counting the angle pilasters. These pilasters, where perfect, have a simple cavetto capital and carry an architrave surmounted by a dentil cornice (Ill. 105). The capitals return



106.—REMAINS OF THE WESTERN PROPYLÆA OF THE ROMAN TEMPLE ENCLOSURE.

on the east side, showing that they rose above any wall in the continuation of the wall eastward. At a later period a tower, 34 feet square, was raised, probably by Arcadius, above the south end of this porticus, about 20 feet high, and crowned with an egg-and-tongue moulding, of which a small fragment only exists on the west side.

One hundred and eighty-six feet to the west of the triple archway, known as the Bab-el-Berid, are the remains of an immense gateway (Ill. 106), which is now known to have been

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the inner front of the propylæa of the peribolos, or enclosure, of the ancient temple. Of this peribolos Mr. Dickie found the traces of the enclosure walls on all four sides, and these and the inner row of columns which carried the roof of the porticus round (some of which still remain *in situ*) enabled him to fix with more positive certainty its extent. It measured 1,150 feet from east to west, and nearly 1,000 feet from north to south, and is, by far, therefore, the largest peribolos known, as that of Palmyra only measures 730 feet by 710 feet. Mr. Dickie traced and measured also the eastern triple doorway of the eastern propylon. Porter, relying on the description of another Arab geographer, Ibn-Asaker, sought for and found two of the columns of the inner part of this propylon, which Ibn-Kethir, 1374, states, "was taken down in 1206, and the stones employed in paving the court of the great mosque."

Beyond the fact that the external walls of the peribolos wall found by Mr. Dickie had pilasters of the same type as those on the porticus, as only the lower portions remained no date can be inferred from them; but as regards the great western gateway, the purity of the carving in the Corinthian capitals, on the architrave, and in the frieze would suggest the possibility of its being the work of Apollodorus were it not for the arch which spans its central opening. This gateway, of which nearly half remains (Ill. 106), consists of four columns (diameter 4 feet 9 inches) and two semi-columns as responds against piers at each end, the junction being marked by a pilaster on each face, 3 feet 7 inches wide. The intercolumniation of the two centre columns is 18 feet 6 inches; and as this was too wide to allow of its being spanned by a single stone, even if both architrave and frieze had been included in its depth, as is sometimes the case, the architect frankly met the difficulty by throwing an arch across, round which he carried frieze and cornice (Ill. 106 shows the springing of the arch). Now the earliest example hitherto known of this design is in the palace of Spalato, built by Diocletian in 284 A.D. But, if built by Apollodorus, this arch must date from the beginning of the second century, because already, in 103, he was employed by Trajan to build the bridge over the Lower Danube, and afterwards (112—114 A.D.) went to Rome and built the Trajan

forum. At a later date, under the Antonines, the feature was a common one, and there are two dated examples of 151 A.D. The triple doorway of the eastern propylæa, discovered by Mr. Dickie, is certainly of later date, and is apparently of the same character as the great doorway (Ill. 104) in the south wall of the mosque, which, with the two side doorways and niches over them, give all that remains of the Roman temple. This was converted by Theodosius (379 A.D.) into the first Christian church. The central doorway, according to Mr. Dickie's measurements, is 14 feet wide and 25 feet high, and its lintel, measuring 19 feet by 4 feet high, is carried through architrave and frieze, with a discharging arch over the cornice, which is also voussoired. It is on the central fascia of this doorway that the famous Greek inscription was carved (the translation of which runs, "Thy kingdom [O Christ] is an everlasting kingdom, and Thy dominion endureth throughout all generations"),\* and which still exists, notwithstanding the Mahometan use of the building for twelve centuries. If the fragments of this wall, 70 feet in length, be the front of the Roman temple, as it faces south, the temple was not orientated, as is usual in Syria. In Rome orientation was not regarded; the temple faced a forum, and was looked upon as a public monument. At Palmyra, however, the temple runs north and south, though the principal portal was on the west, facing the propylon. There was probably in this Damascus example a portico in front, and the temple may have been peripteral. Proportionately with Baalbek, the rear wall of the cella may have been under the north wall of Al Walid mosque, as he instructed his architects to search for and utilise the ancient foundations. This, however, is mere surmise. The design of this front, and its carved enrichments are similar to those of the temples in the Hauran and at Baalbek, ascribed to the age of the Antonines (138—180 A.D.). The only other Roman fragments to which we have now to draw attention are four Roman piers (see plan) which Mr. Dickie saw from the minaret gallery, and which would seem to have formed an inner propylæa to a

\* The Septuagint version of Psalm cxlv. 13, the words "O Christ" being interpolated in the inscription.

second enclosure, which may have been a porticus similar to that on the western side, but of which no other remains exist (see plan). Whilst Theodosius converted the temple into a church his son Arcadius enlarged it, and on either side of this temple façade up to the porticus before mentioned, and including the substructure of the south-east minaret (with the exception of a break of about 135 feet on the west side next to the western tower, which has been rebuilt), Mr. Dickie found a series of pilasters similar to those of the porticus, but of inferior execution, and crowned, as well as the interspaces, with an ogee moulding, which he considers forms the addition made by Arcadius. On the west side of the eastern tower, and at the same level, this ogee moulding exists within the mosque, and above it were eight recesses for beams, which suggested the original aisle roof of Arcadius's extension. This string course is 23 feet above the level of the mosque, and about 26 feet 6 inches above the Roman platform, presumably the level of the Christian church. According to Ibn al Fakih (903 A.D.) those portions of the substructures of the south-east and south-west minarets which rise above the porticus and eastern angle, and against which Al Walid's mosque is built with a straight joint, were "originally watch towers in the Greek—viz., Christian Greek—days, and belonged to the church of St. John.

We now come to the great mosque itself, which, according to the evidence given by all the Arab geographers, was built by the Khalif Al Walid in 705—713, who pulled down the ancient church of St. John. From the descriptions already given, however, it will be noticed that the Khalif availed himself of the whole of the existing south wall with its return at the eastern angle and the porticus. It is possible also that he utilised the columns and capitals of the church, though in the city itself there was abundant material, and he may have built his arcades dividing the three aisles on the same foundation walls except that it is not usual in Christian churches to make the nave and aisles of the same width. If, however, he utilised the front of the Roman temple he neglected to avail himself of the central doorway, across which comes the south end of the eastern wall of his transept. He built his transept, in fact, in



the central axis between the eastern and western towers, above referred to. With reference to this transept, the destruction by fire has revealed the singular fact that the dome was an afterthought, not contemplated when the transept was built. The three windows on the east and west sides of the central bay of transept above the arches are masked by other arches built within them to carry the dome (the position of these windows is shown by dotted lines on Ill. 102); and, moreover, as pointed out by Mr. Dickie, "a straight vertical joint in each pier exists between the transept arch piers and the piers carrying the dome and the horizontal beds are not in the same line." As, however, there is no suggestion in any of the descriptions by the Arab geographers that the dome was built afterwards by any other Khalif, it can only be assumed that the Byzantine artists employed by Al Walid, and more especially those who were charged with the mosaic decoration of all the external (court) and internal walls, suggested that a dome was a necessary feature, and one in which mosaics appeared to the greatest advantage, hence its addition by Al Walid.

The first full description of the mosque, and one which the reader will now be able to follow from what has been already said as to its general design, is that of Mukaddasi, 985 A.D., from which we quote only those paragraphs which refer to the mosque itself: "The mosque of Damascus is the fairest of any that the Moslems now hold, and nowhere is there collected together greater magnificence. Its outer walls are built of squared stones accurately set, and of large size; and crowning the walls are splendid battlements.\* The columns supporting the roof of the mosque consist of black polished pillars in a triple row,† and set widely apart. In the centre of the building, over the space fronting the mihrab,‡ is a great dome. Round the court are lofty colonnades,§ above which are arched windows, and the whole area is paved with white marble. The (inner) walls of the mosque, for twice the height of a man,

\* The battlements are all gone; those at the foot of the south-west minaret may have been copied from them.

† This suggests that the piers on north side were originally columns.

‡ The mihrab is the niche in south wall, which shows the direction of Mecca, towards which the Moslems pray (Ill. 107).

§ Really arcades.

are faced with variegated marbles ; and above this, even to the very ceiling, are mosaics of various colours and in gold, showing figures of trees and towns (Ill. 98), and beautiful inscriptions, all most exquisitely and finely worked. And rare are the trees and few are the well-known towns that will not be found figured on these walls. The capitals of the columns are covered with gold, and the vaulting\* above the arcades is everywhere ornamented in mosaic. The columns round the court are all of white marble, whilst the walls that enclose it, the vaulted\* arcades, and the arched windows above are adorned in mosaic with Arabesque designs. The roofs are everywhere overlaid with plates of lead, and the battlements on both sides are faced with the mosaic work." "On the summit of the dome of the mosque is an orange, and above it a pomegranate, both in gold. But the most wonderful of the sights here worthy of remark is verily the setting of the various coloured marbles and how the veining in each follows from that of its neighbour. It is said that the Khalif al Walid, in order to construct these mosaics, brought skilled workmen from Persia, India, Western Africa, and Byzantium, spending thereon the whole revenue of Syria for seven years, as well as eighteen shiploads of gold and silver which came from Cyprus."

Yakûbi, 874, writes : "Al Walid spent on the building of the mosque in Damascus the land tax of the Empire during seven years. He finished the building thereof in the space of eight years. The accounts of the expenditure were brought to him on the backs of eighteen camels, but he ordered them all to be burnt. There is praying space for twenty thousand men in this mosque, and there are six hundred gold chains for suspending the lamps. Of Zaid Ibn-Wâkid it is related that the Khalif al Walid made him overseer for the building of the mosque, and he discovered there a cave, the fact of which was made known to al Walid. By night the Khalif descended thereinto, and behold it was a beautiful chapel three ells long by the like across, and within lay a chest, inside of which was a basket, on which was written : 'This is the head of John,

\* Probably the soffits of the arches, as there is no vaulting except in the dome.

the son of Zacharias,' and after they had examined it, Al Walid commanded that it should be placed under a certain pillar in the mosque that he indicated. So it was placed beneath this pillar, which is the fourth of those on the eastern side."\*

Mukaddasi's description is so clear that it does not seem to be necessary to add to it, except to refer to the remains of the mosaic decoration, which we shall do later on. There is, however, one point to which attention might here be directed. In the earlier mosques of Amrou or Amr, at Cairo, of Kairouan, in Barbary, and in the mosque of Cordova, the arcades which divide the aisles run in the direction of Mecca, converging towards the mihrab, which is their altar. In the mosque of Ibn-Tooloon (897 A.D.), however, they run the other way. This, apparently, was necessitated in order to resist the thrust of the much heavier construction in brick. In the mosques above quoted the supports are marble columns, and the thrust of the arcades they carried is met in another way by having wooden ties above the capital. With brick construction a deep buttress would have been required on the court front which would have interfered with the lighting of the mosque. By carrying the arcades at Damascus east and west, their thrust was counteracted by the buildings on the east and west sides.

In the month of May, 1069, in consequence of a fight in the town between two of the sects, the Fatimites and the Shiah, one of the houses near the mosque was set fire to; the fire spread to the mosque, and destroyed most of its treasures.

Its restoration commenced shortly afterwards, and a Cufic inscription on one of the piers of the transept, translated by Mr. H. C. Kay, states that the cost of the construction of the maksûrah (the south transept) and the decoration of the walls was defrayed by Abu Nast Ahmed Ibn Al Fadh in 1082 A.D. The next description from which we propose to quote is that of the Spanish Arab, Ibn-Jubair, who visited Damascus in 1184. Curiously enough, he does not refer to the fire of 1069. He commences with the traditional history of the building of the mosque, and quotes the cost of its erection, which he puts at 11,200,000 dinars (about five and a half millions sterling). Of

\* The tomb stood between the third and fourth columns on the east side of the south aisle, and has been destroyed by fire or rebuilt three times at least.

its decoration with mosaic he speaks in the past tense,\* as if there was not much remaining. When later on he comes to the decoration of the four great piers, which we know from the above inscription was carried out in 1082, he adopts the present tense as if he were describing what he actually saw, and that gives a special value to this portion of his account. Unfortunately, he does not discriminate always between piers, pilasters, pillars, and columns, so that it is difficult to know to what features he is referring. However, he says fifty-four are pillars that stand alone, and, as there are only forty columns in the two central arcades, fourteen (or seven on each side) of the piers of the north wall may then have been columns. Possibly, on account of the thrust of the great arch of the north transept (see Ill. 99) the two supports of the arcades on each side were piers. Of the piers and columns of the great court he says: "The number of its columns is forty-seven, of which fourteen are pilasters of gypsum and the remainder are free standing;" by "pilaster" he means *piers*, and by "the remainder" he means free standing columns; and this is in accord with what exists, except that fourteen of the columns have been encased, some within the last century (Porter). Nearly all of these piers are now coated with stucco, and rich Arabesque designs on them. The most valuable portion of Ibn-Jubair's account is that which refers to the central dome and to the ceilings of the north and south transepts. Mukaddasi speaks of one dome only which was probably of stone covered with lead, and decorated internally with mosaic, which was, we contend, the principal object of its erection. Externally it was probably of no great height, as no reference is made to it. Ibn-Jubair, however, in 1184, descants on the immense height of the great dome which "broods over the void." He describes also how that it consisted of an *external* and *internal* dome, and was raised externally on a drum,† which we know was not an early Byzantine characteristic.

\* Dimashki, 1300 A.D., says, however: "The walls of the mosque are faced with marble after the most exquisite manner ever seen, and above are mosaics in coloured glass, and gold and silver," so that a great deal more may have existed in his day than now.

† The drum was introduced under the dome in the ninth century in order to obtain better light through windows pierced in it.

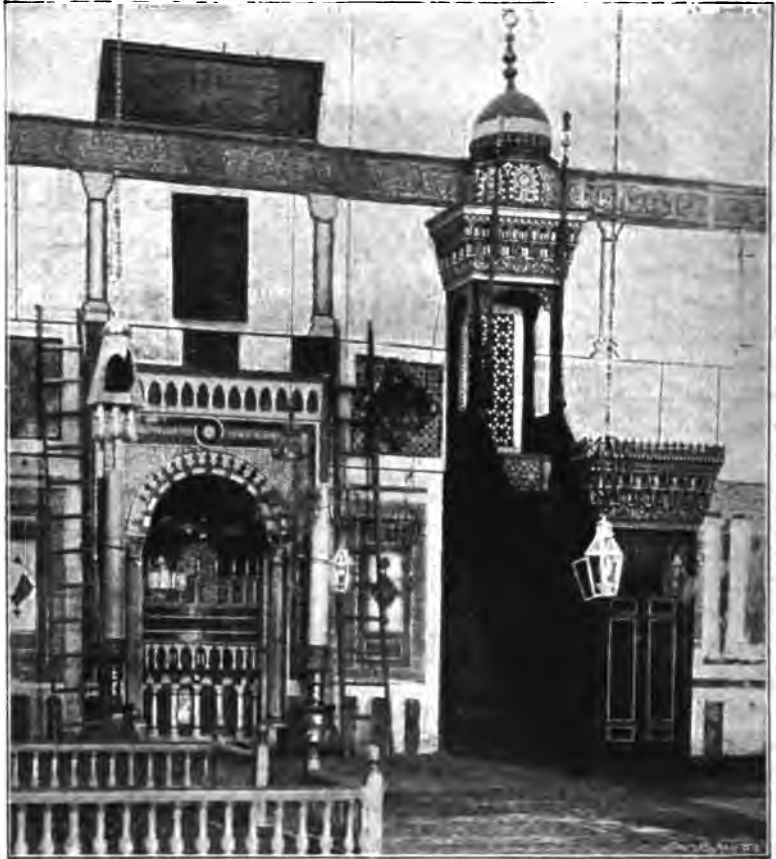
From this it may be assumed that Al Walid's dome succumbed in the fire of 1069, and the following is the description given by Ibn-Jubair of that which succeeded it, probably built between 1069 and 1082, because they would scarcely commence the decoration of the maksûrah, already referred to (south transept), until the roofs were terminated.

"A central nave is below it [viz., the transept] going from the mihrab [the Mecca niche] to the court; and over this nave [as seen from the interior] are three domes—namely, the dome which is close to the mosque wall towards the court, the dome which is over and adjacent to the mihrab, and the dome which is below [forming the inner or lower cupola of], the Kubbab-ar-Rasas [the dome of lead] rising between the other two."

Later on he describes his visit to the interior of these two domes. "He went up by a ladder to the western colonnade that goes round the court, and walked on the flat roof." This shows us that in the restoration after the fire of 1069 the roofs were sufficiently low-pitched to walk across.\* "The roof," he continues, "is covered with large sheets of lead, the length of each sheet being four spans, and the width three spans [span = nine inches]. After passing on the flat roof, we came to the dome, and mounted into it by a ladder placed there; and doing so it almost happened we had been seized with dizziness: we went into the round gangway [this was round the outside of the lead dome], which is of lead, and its width but of six spans, so that we could not stand there, fearing to fall over. Then we hastened on to the entrance into the interior of the dome, passing through one of the grated windows which open to the leadwork, and before us was a wondrous sight. We passed over the planking of great wood beams which go all round the inner and smaller dome, which is inside the outer leaden dome as aforesaid, and has one or two arched windows through which you look down into the mosque below. From here the men who are in the mosque look like small children. The dome is round like a sphere, and its structure is made of planks

\* According to the traces of the height of the original roof, on the east wall of nave, there were three low-pitched roofs: these were replaced after the fire of 1400 with three high-pitched roofs, as already described, our reason for the date being given further on.

strengthened with stout ribs of wood, bound with bands of iron. The ribs curve over the dome and meet at the summit in a round circle of wood. The inner dome, which is that seen from the interior of the mosque, is inlaid with wooden panels.



107.—VIEW OF MAKŚURAH, OR PRAYER CHAMBER, SHOWING MIHRAB AND MIMBAR.

They are all gilt in the most beautiful manner, and ornamented with colour and carving. The great leaden dome covers this leaden dome that has just been described. It also is strengthened by wooden ribs bound with iron bands. The number of these ribs is forty-eight, and between each rib is a space of four

spans ; the ribs converge above, and unite in a centre piece of wood. The great double dome rests on a circular base, built



108.—NORTH-EAST AISLE OF MOSQUE OF DAMASCUS.

of mighty blocks, above which rise short and thick pilasters built up of large stones of a very hard kind, and between every

two pilasters is pierced a window. Thus the windows extend all round the circle under the dome. Of the wonders of the place it is that we saw no spiders\* in the framework of the domes, and they say there are none here at all."

The domes over the north and south transept were in timber only, and under the roof of the two transepts.

We have now to consider what other restorations were carried out after the fire of 1069. Sir Charles Wilson, who measured the mosque in 1865, noted the fact that in the eastern half of the building several columns of smaller size had been used, and that in some cases they stood on fragments of the original columns: "a shaft 6 feet in circumference stands on the old shaft, which is 7 feet  $1\frac{1}{2}$  inches in circumference, and broken off about 2 feet above its base." Again: "In the eastern half there is a variety of capitals; two at the south-east corner are Ionic, and many of the Corinthian capitals which have been taken from ancient buildings are too small for the columns on which they stand" (see Ill. 108). The fact is, that in the latter half of the eleventh century there was no longer that wealth of ancient Roman remains in the city of which the Khalif al Walid was able to avail himself in the commencement of the eighth century; hence columns of smaller size and a variety of capitals. The destruction of the roof of the eastern half apparently calcined the stonework of the transept, so that it became necessary to protect it externally with stucco, and on this stucco they painted decorations of towns in imitation of the designs of the mosaic on the transept wall. A portion of this still exists between the roofs of the centre and south aisle, but has only been exposed to view since the destruction of the high-pitched roof by the fire of 1893.†

In 1400 the town was besieged and taken by Timurlang, or Tamerlane, and the mosque was set on fire and burnt. There do not seem to have been any accounts written by the Arab geographers since, and therefore we have to read the subsequent history of the mosque from what existed prior to the great fire

\* The roof was built of chestnut, with which, according to Sir Charles Wilson, spiders do not agree.

† This is shown on Ill. 109 in a patch above the respond of south-east arcade, but it is less clear in the print than in the original photograph.



of 1893. The internal and external dome over the centre of transept, and the timber cupolas over the north and south transepts, disappeared, and were replaced by a single dome on a drum, all built in stone, and flat ceilings on immense beams, as shown in sections, cover the transepts (Ill. 100).

The roofs before 1400 were what Ibn-Jubair calls flat roofs; the traces of the original gable ends on the east wall of nave show, however, that they were low-pitched roofs, similar to



109.—EASTERN SIDE OF TRANSEPT, MOSQUE OF DAMASCUS, AFTER THE FIRE.

that of the transept, though possibly of even lower pitch. These were entirely destroyed and replaced by the high-pitched roofs already described (see general view after fire of 1893, Ill. 109). Otherwise the main structure does not seem to have materially suffered; the tomb of St. John, between the third and fourth pillars of the earlier aisles, was probably destroyed, as also the capitals of the two columns on each side above it, and instead of employing again ancient capitals the new ones show the stalactite design which characterises all Mahometan architecture. The tomb has been rebuilt several times, and that

destroyed in 1893 may in the seventeenth century have replaced the tomb restored after 1400. That which is, however, the



*Photo by Prof. Max van Berchem.*

110.—INTERIOR OF MOSQUE OF DAMASCUS FROM THE WEST END (SHOWING ROOF).

most remarkable is the utter destruction of both arcades on the east side, after the fire of 1893, and of the north arcade on the west side. None of the four seem to have suffered much in

1400, and those in the eastern half only were damaged in 1069. This greater destruction may be due to two causes; first, the enormous amount of timber in the high-pitched roofs; and, second, the fact that, in order to conceal the much-damaged tessellated pavement of the church, nearly the whole place was covered with splendid carpets. When one of these got worn out or looked shabby some devout Moslem presented another, which was placed on the top of it. There must have been an accumulation, therefore, of combustible material, which, when the smoking embers of the roof fell on it, must have seriously added to the total destruction. At some unknown period the roofs of the two transepts were raised, masking the windows on the drum of the dome, as rebuilt after 1400: this change may have been made at the end of the 18th century, and it was a great disfigurement. It is shown on Ill. 101. The inscription on the south-west piece of the transept, which Mr. H. C. Kay deciphered, and to which reference has already been made, informs us that the marble decoration of the maksûrah was executed in 1082. It does not, however, follow that because the inscription has remained intact the marble decoration has also, and the style of the work on the piers and on the south wall on either side of the mihrab (see Ill. 107) is of a later period. The mimbar, or pulpit, shown in the same illustration is fifteenth-century work, and, owing to its similarity to those in Cairo, may possibly have been executed by the Sultan Kaït Bey, who built the south-west minaret. The principal mihrab, or Mecca niche, would seem to have been of earlier date. Its design is similar to that of the Kalaoun Mosque at Cairo (1287), and the Corinthian shafts on each side are similar to those of the mihrab in the mosque of Sultan Hassan (1361). These shafts were destroyed in the fire of 1893. The recess of this niche, curiously enough, is sunk in the left hand or western doorway of the Roman temple front in Ill. 104. It is decorated with tier above tier of small arcades of marble (see Ill. 107) with inlays of mother-of-pearl and mosaic, and the lower range is so Byzantine in style as to suggest its having been the original mihrab of Al Walid, restored only after the fires of 1069 and 1400.

The original marble panelling, we are told by Mukkadasi,

rose to twice the height of a man, but the actual remains are 20 feet high round the piers and 25 feet on the south wall. The frieze above the simulated shafts, as seen in Ill. 107, is of pure Arabesque design, and the setting of the various coloured marbles as described by Mukaddasi, where "the veining in each follows from that of its neighbour," such as is found at Sta. Sophia at Constantinople and at St. Vitale at Ravenna, was not reproduced in the restoration after the fire of 1400. The south wall in the eastern and western portions of the mosque was panelled with marble to a height of about 15 feet, but of very simple design, but above that, as well as throughout the mosque, except in the north transept, all the walls are covered with plaster.

The most interesting example of the effect of the several fires of 1069, 1400, and 1893 was shown on the north side of the south-east pier of transept. The band leaning slightly forward, which forms the impost of the great arches of transept (Ill. 98), is decorated with a flat incised ornament of the style of the period of the first mosque, erected at the beginning of the eighth century, and is pure Byzantine work; but whether it is the original marble slab or a plaster cast taken from the same, and fixed there on the decoration of the mosque after the fire of 1069, it is difficult to say. In the exposed position it occupies it is scarcely possible that the *marble* would last through three fires, but *plaster* is not much damaged by fire: it is discoloured sometimes, sometimes it is bleached. This was shown in the illustrations published in the *Architectural Review* in 1897 of the plaster statues in the vestibule of the Tuileries, and the plaster decorations of the Hôtel de Ville, which remained intact, whilst all the marble statues and the stone decorations were completely calcined by the fire.

Of the four arcades which divide the eastern and western aisles only one—the south-western—escaped destruction. The broken columns of the other three were utilised, as we are informed by Dr. Masterman, to mend the roads with in the vicinity of Damascus.

Ill. 110 is a valuable record of the interior taken by Prof. van Berchem before the fire, and here also the old roof is well seen.

A photograph of the transept was taken after the fire by Professor van Berchem (reproduced in Ill. 111), and as the



*Photo by Prof. Max van Berchem.*

III.—MOSQUE OF DAMASCUS. THE TRANSEPT AFTER THE FIRE.

point of view was nearly the same as that selected by the author in 1866 for his water-colour drawing (reproduced in S.T. R

Ill. 98), comparison of the two will show how little has been preserved of the mosaic decoration on the north wall. That which remains now is not much more than the stucco incrustation in which the tesserae of the mosaics were imbedded. The stucco framework in which the stained glass was fixed still remains in the upper windows above the north doorways, but the glass has all gone.

All the marble inlay panels which decorated the lower portion of the piers was destroyed. We are informed by Dr. Masterman that the whole of the marble panelling has since been taken down and stored; but whether it will be possible to utilise it again remains to be seen.

A great and irreparable loss has been sustained by the destruction of the two magnificent ceilings over the north and south transepts of early fifteenth century work. Judging by the crude decoration of the dome (now destroyed) all sense of colour would seem now to have disappeared in the East.

The last illustration (Ill. 112) is a view of the south-west angle of the great court described on p. 232. At first sight it would seem to be in two storeys, but the great corridor round the court rises to the roof; here as inside the mosque (Ills. 108 and 110), desiring to obtain greater height in the structure than the columns at their disposition afforded (as mentioned on p. 220), an additional storey was raised, pierced with coupled arches divided by shafts.

In the foreground will be noticed a structure built upon eight columns, which is known as the Treasury (Bait al Mâl). The columns are partially buried, as the pavement of the court is raised some 3 feet 6 inches above the old Roman platform. Both columns and architecture belong to the Roman period, so that it is possible we have here the enclosure of a sacred well within the Roman peribolos, which the Moslems have utilised to carry a chamber containing perhaps the records of the mosque. Ali of Herat, who wrote in 1173, states that in his day it was pointed out as being the tomb of Ayîshah, the Prophet's favourite wife.

It remains now only to say a few words about the restoration of the mosque, for information respecting which I am indebted to Dr. Edwin Freshfield, who visited the mosque just before the

visit of the German Emperor. Dr. Freshfield writes: "The actual condition of the mosque is this. The whole of the eastern limit, together with the crossings, are one workshop bounded off from the western limit. Apparently the architect has begun his restoration at the eastern end. The whole of this part has been roofed up to the transept, and they are now



112.—COURT OF MOSQUE OF DAMASCUS, AND THE TREASURY.

engaged putting up a dome in the preparation for use in the crossing. The eastern limit is pretty well forward; the pillars are all replaced by white limestone shafts with Corinthian or Composite capitals, a part is floored, but as you come to the crossing it is still being worked at. The last bays of the eastern limit at the crossing itself are full of scaffolding, and there is still a good quantity of the old marble ornament and the mosaic upon the walls, particularly the north wall of the transept—

I suppose all to come down and be destroyed. The western limit is open to the air, but practically untouched." Towards the end of a second letter Dr. Freshfield remarks: "The poor old mosque won't know itself when it is finished"—a paragraph which suggests that the great mosque built by the Khalif al Walid practically exists no longer.



# THE INFLUENCE OF GREEK ART ON THE PERSIAN ORDER.

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## SUMMARY.

THE EARLY MISCONCEPTION AS TO THE ORIGIN OF THE PERSIAN ORDER, AND ITS ATTRIBUTION TO ASSYRIA—PROBABLE SOURCE TO BE FOUND IN MEDIA—THE EARLIER EXAMPLES OF THE PERSIAN PALACES AT PASARGADÆ AND PERSEPOLIS—THE CONSTRUCTIVE VALUE OF THE PERSIAN BULL-HEAD CAPITAL AS EXEMPLIFIED IN THE TOMB OF DARIUS AND THE PORTICO OF HIS PALACE—DESCRIPTION OF THE GREAT HALL OF XERXES AT PERSEPOLIS IN WHICH THE COMPLETE DEVELOPMENT OF THE PERSIAN ORDER IS FIRST FOUND—THE CONJECTURAL RESTORATION OF THE GREAT HALL BY COSTE AND OTHER FRENCH AUTHORS BASED ON INACCURATE DATA—MR. WELD-BLUNDELL'S DISCOVERIES—ANALYSIS OF THE FULLY DEVELOPED ORDER AT PERSEPOLIS AND SUGGESTIONS AS TO THE ORIGIN OF THE SEVERAL PARTS COMPOSING THE CAPITAL AND BASE, AND THE SOURCE OF ITS FLUTED COLUMN—COMPARISONS OF ALL THESE WITH EXAMPLES OF ARCHAIC GREEK WORK GIVEN IN DETAIL.



## THE INFLUENCE OF GREEK ART ON THE PERSIAN ORDER.

WHEN, in 1851, shortly after Layard's discoveries at Nimroud, Fergusson published his work on the palaces at Nineveh and Persepolis, and later on reproduced in the Assyrian Court at the Crystal Palace his conjectural restoration of an Assyrian palace, he copied therein the Persian order as developed in the great hall of Xerxes at Persepolis, his assumption being that Xerxes had copied in stone the columns and capitals which in the Assyrian palaces had been in wood only, and had consequently perished either in course of time or in a conflagration. Layard's subsequent discoveries, followed by those of La Place at Khorsabad, have thrown additional light on the subject, which render Fergusson's theories extremely doubtful. Into this subject we do not propose to enter here, but the unfortunate selection of architectural details made by Fergusson from the palaces built by Xerxes in 485 B.C., on his return from his expedition through Greece and Asia Minor, has led the student into the belief that the Greek Ionic order owes the origin of some of its principal features to an Assyrian source, and in his description of Greek architecture Fergusson refers frequently to this subject.

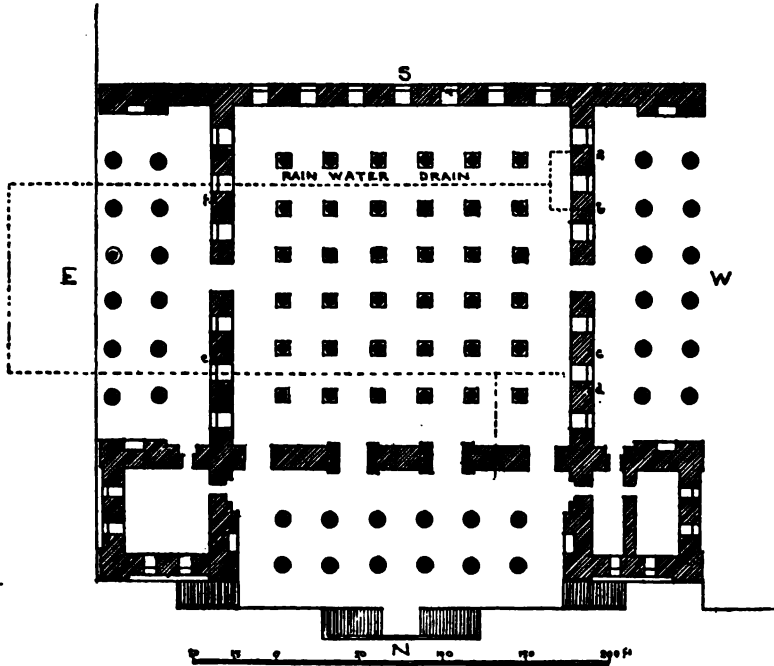
The object of this essay is to show that in his development of the Persian order, as found in the palaces of Persepolis and Susa, Xerxes was indebted to Greek models and possibly to Greek artists, and this task has been rendered easier in late years by the discoveries of archaic Greek work, some of which is nearly two centuries earlier than the work in the palaces referred to.

It is necessary first to point out that the early work of Cyrus and Darius (restricting our inquiry to the Persian order of columns only) bears no resemblance whatever to any remains

found in Assyria or suggested in the bas-reliefs which have been brought to Europe, or known by drawings made from other examples. If we are able to accept the clear description given by Polybius of the great palace at Ecbatana, constructed probably by Cyaxares about 620 B.C., and enlarged and restored by the Achæmenian monarchs, it is to the capital of the Median monarchy that Persia owed the source of her inspiration. Polybius (X. 24) states that the columns of the stoas and peristyles of the palace at Ecbatana were in cedar and cypress, supporting beams and framed ceilings in the same material, all covered with silver plates, and that the roof was covered with silver tiles. The ephemeral nature of the one material and the intrinsic value of the other are sufficient to account for their entire disappearance, but of the restorations by Darius and Xerxes, who occupied Ecbatana as one of their capital cities, many remains have been found, and the stone columns, bases, and capitals are similar to those found at Persepolis and Susa. If the *stoas* and *peristyles* mentioned by Polybius were halls of columns and porticoes, we are able not only to account for the origin of the Persian order, but for the plans of the palaces at Persepolis and Susa, the only change being that stone columns have been substituted for those which, in the palace built by Cyaxares, were in timber only, the entablature being still in wood, as evidenced by the wide intercolumniation of from  $4\frac{1}{2}$  to  $5\frac{1}{2}$  diameters.

The earliest Persian palace of which remains exist was that built by Cyrus, the first king (560 B.C.), at Pasargadæ, where he defeated and took prisoner Astyages, the last Median monarch. Of this Persian palace there remains *in situ* only one column, unfluted, over 30 feet high, built in three drums, with a plain circular base, and three stone antæ, 21 feet high, on the upper portion of which are the sinkings in which the timber architraves were housed. The foundation bases of other columns have been found and portions of the foundations of walls, which showed that the palace consisted of a central hall of columns and, at least, one portico. The design was evidently of the simplest kind, showing that in its origin the Persian order had none of the elaboration found in the work of Xerxes. The same may be said of the palace built by Darius at Persepolis

in 521 B.C. No columns were found there, but the foundation bases of all those in the central hall and entrance portico were still *in situ*. Only one stone anta remains, in the upper portion of which are the sinkings for the housing of the entablature. In Ill. 114, Fig. 1, the section represents the actual sinking in the stone, and, taken in conjunction with



113.—PLAN OF GREAT HALL OF XERXES, PERSEPOLIS.

the tomb of Darius at Istakr, close to Persepolis, is of great value, as it enables us to make a conjectural restoration, at all events, of a portion of the entrance portico (Ill. 114, Fig. 2), which would seem to have been copied in the tomb, and was of the same dimensions in width and height. Here we find the oldest example remaining of the Persian capital, which consisted of two bull's heads and half-bodies, forming a bracket capital to support the architrave, and carrying on their backs a corbel which projected in front of the column so as to carry

a *projecting architrave* (Ill. 114, Fig. 1). Such a feature actually exists in the tomb façade and the sinking in the anta proves its existence in the portico of the palace. In order to balance the weight, we have suggested a similar feature at the back, so that the Persian capital was a quadruple bracket capital, which neither Coste, Dieulafoy, nor Perrot and Chipiez seem able to realise. In the tomb the columns carved are only semi-attached, so that the bracket in the rear does not occur. The columns carved in the tomb are unfluted, and their bases consisted of a plain torus moulding on a square die. The front view of the bull-headed capital is shown in Ill. 114, Fig. 5. The only other early example of a base is that found by M. Dieulafoy at Susa, with the name of Darius inscribed on it (Ill. 114, Fig. 4). This base is known as the campaniform base, and its origin, as also that of the bracket capital, is suggested in Ill. 114, Fig. 8, which represents a portion of a projecting porch or shed in front of a peasant's house, as found down to the present day. The oblong block had for its object a better support for the architrave beam than that given by the post alone, and to preserve from damp the lower portion of the post it is usually raised on a base consisting of rubble stones coated with mud. As both these features, viz., the bracket capital and the campaniform base, are peculiar to the Persian order, and are not found in any other known style, we are inclined to assign to them a Median origin.

The intercolumniation of the columns carved on the tomb of Darius is  $4\frac{1}{2}$  diameters ( $5\frac{1}{2}$  centre to centre) and the relative proportion of height is  $10\frac{1}{2}$  diameters, which suggests that the superstructure was in wood, and, as shown in the tomb of Darius and in the anta of his palace, consisted of squared beams projecting slightly one in front of the other. Beyond that, as all the timber work has perished, we have no further evidence, and our description of the development of the order under Xerxes is confined to the columns.

Before entering into this question a few words on the Great Hall of Columns built by that monarch at Persepolis, may not be out of place, especially as there exist some wide divergences of opinion with respect to its conjectural restoration. If we have ventured to dispute the correctness of Fergusson's

theories respecting the restoration of an Assyrian palace, there is no doubt that in his conception of the plan of the hall of Xerxes, as set forth in his work already referred to, he followed the only interpretation possible, and his statement "that some restorations he had seen were too absurd even to merit exposure" has been borne out by later discoveries. Fergusson contended that (A) the Central Hall of Columns was inclosed with a wall (see Ill. 113); (B) the stone pedestals (shown in black on plan) were the plinths of entrance doorways in this inclosure wall; (C) there were antæ to all the three porticoes; and (D) the angles of the main front were occupied by square halls containing wood staircases leading probably to the roof.

Fergusson's theory was based on the existing plans of other palaces at Persepolis and on that at Susa. These palaces being, firstly, the palace of Darius, already referred to; secondly, a palace inscribed with the name of Xerxes; thirdly, the palace of the Hundred Columns; and fourthly, the palace at Susa. In the first two named there still remain the stone foundations of the square chambers or halls at the angles, and in all these cases the central hall of columns was surrounded by a wall. In the palace of Darius, in addition to the features already named, there exist at the back of the portico the great doorway leading to the central hall and two windows on each side. These features were all in great blocks of stone, one for each jamb and one for the lintel and carved cornice, with stone sills for the windows; similar features exist in the other palaces at Persepolis. The walls which connected these isolated features are gone, and from the projecting stone bossing in their sides it is conjectured that they were built either in unburnt bricks or in rubble masonry laid in clay mortar, which was bonded with the projecting bosses,\* and that in course of time this ephemeral construction has disappeared. This is the case with all the other palaces and the stone foundations only on which these burnt bricks rested are found.

Coming now to the conjectural restorations of the great hall of Xerxes. In consequence of the immense size of its doorways

\* In nearly every other case instead of the projecting bosses there are sinkings or recesses into which the brickwork was bonded.

they were built in coursed masonry, and all that remains of them are the plinths of two of them about 4 feet high. These were assumed by Flandin and Coste, followed by Perrot and Chipiez, to be altars, but it should be noted that on three sides only were they worked to a fine face; on the fourth side (see plan) is that recess into which the wall was bonded.

On the platform of the great hall Flandin and Coste found a number of vertical stone drains which they assumed were intended to drain the surface of the platform, and they indicated on their plan the connexion of these, one with the other, by a horizontal drain running under what would have been the site of the east and west inclosure walls of the great Hall.\* Further, they stated that on the south side of the southern row of columns of the great Hall and in the angles of the north front the natural rock existed everywhere and bore no trace of having carried a wall. Based on these assumptions, Flandin and Coste, followed by Perrot and Chipiez, contended that, firstly, there could have been no inclosure wall to the central hall, as no one would erect a wall of crude brick on a site below which ran a great drain; and, secondly, there was no evidence of a superstructure on the natural rock of the south side. They assumed the doorway plinths in the north inclosure wall to be altars, and put forth a conjectural restoration of the great hall consisting of four groups of columns only; a centre group of thirty-six columns in six rows of six each, and north, east, and west groups of twelve columns each, arranged in two rows of six each, all of these groups standing isolated one from the other on the raised platform of the great hall.

In 1891 Mr. Weld-Blundell went out on a mission at the instance of, and partly at the cost of Lord Savile and Mr. Cecil Smith, to take casts of some of the sculptured bas-reliefs at Persepolis, and the author of this essay furnished him with a plan of the site and directed his attention to some of the points at issue. Mr. Weld-Blundell ascertained, firstly, that of the vertical stone drains, the remains of one of them

\* Fergusson, in his work already referred to, p. 147, says "these gentlemen" (Flandin and Coste) "make the drains proceed from one to the other; and though it may appear impertinent in one who has never been there to say so to those who have, my own impression is that this junction does not exist." As will be seen later on, Fergusson's statement was correct.



(*a* on plan) rose 15 inches above the pavement of the hall, and must, therefore, have been carried up in the wall to drain the roof; secondly, that these drains\* were not at their feet connected one with the other, but that each one at its foot was diverted into other drains running between the first and second row of columns (see plan); thirdly, that the natural rock as it appeared to Flandin and Coste, on the south side of the hall and on each side of the main front, was one which had been formed in the course of time by nature; the fine clay moistened by rain had been baked by the blazing sun to the apparent consistency of the natural rock, and was as fine and smooth as that which existed elsewhere. Mr. Weld-Blundell broke through this crust, and on the south side of the hall found about 6 inches below this crust the foundations of a wall 11 feet 8 inches thick, running the whole length of the south front, and at the angles of the north front he found the foundations of the corner chambers, with an accumulation of charred wood; which he concluded had fallen from the floors and roofs of these halls. MM. Perrot and Chipiez work, *La Perse*, was published before 1891, and they were, therefore, not aware of these discoveries, which throw an entirely new light on the actual plan of the great hall, though Fergusson contended from the first that Coste must have been mistaken in his conjectures and in the plan he showed of the drains. These subterranean drains were entered by Mr. Weld-Blundell; they were partly cut in the solid rock and partly hewn out of immense blocks of stone; they measured from 2 feet 3 inches to 2 feet 8 inches wide, and in some parts were 8 feet to 10 feet high. They crossed the palace in two lines, and were connected with other drains leading to the outside of the great acropolis platform. The vertical stone conduits were cut in solid blocks of stone, the apertures of the gullies being 1 foot 3 inches square.

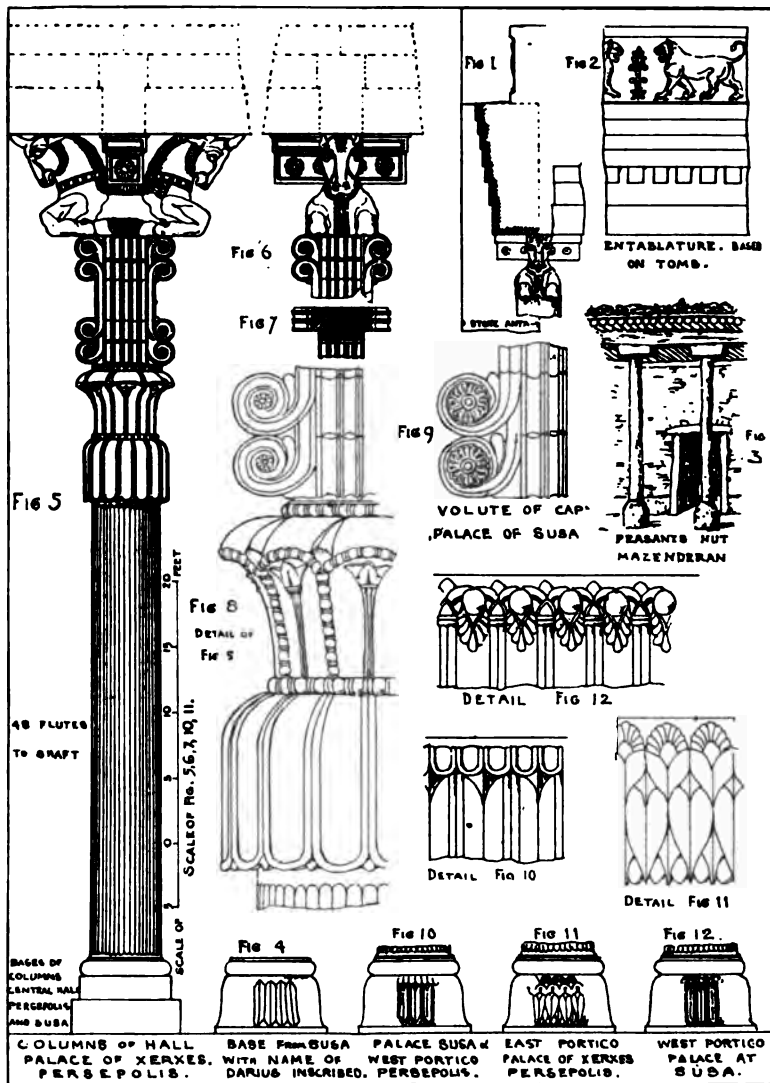
The principal development in the Persian column as set forth in the palaces built by Xerxes at Persepolis and Susa was, in the variety of design given to the campaniform basis,

\* Mr. Blundell found six gullies, marked *a* to *f* on plan; he described *a* and *b*, and traced their connexion with the others shown. The other vertical drains were filled up with silt.

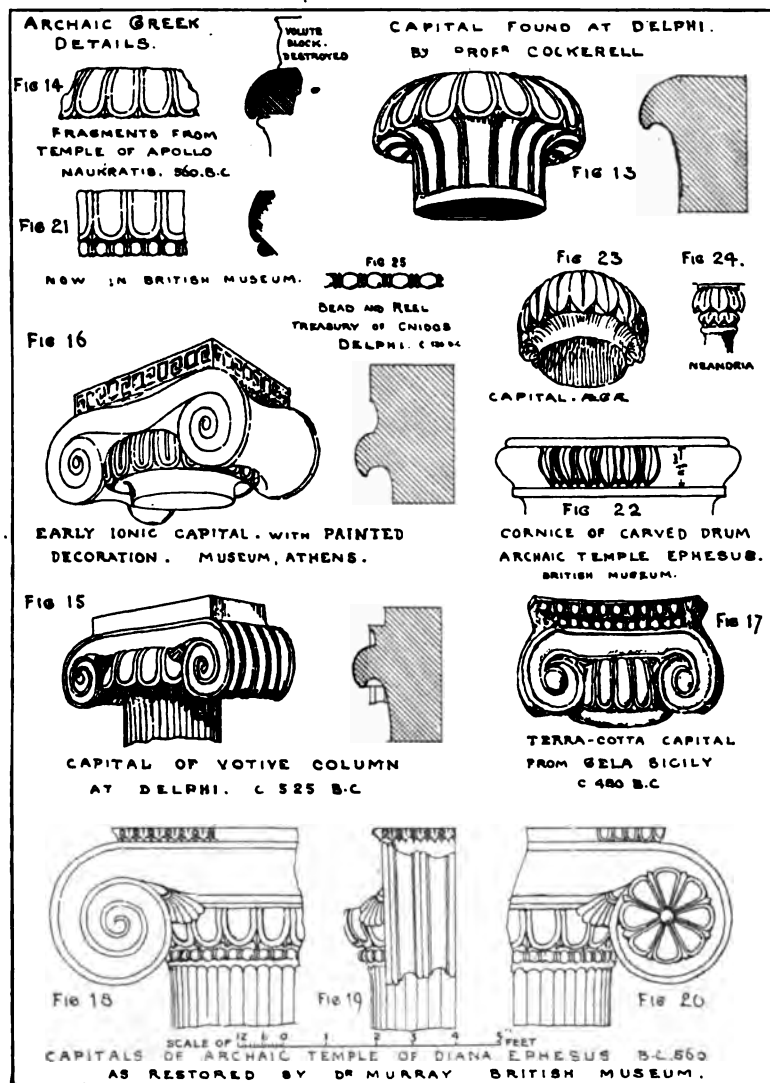
the fluting of all the columns, and the additional decorative features of the upper part of the shaft under the bracket capitals, not found in any earlier examples. In these we seem to recognise a new influence, which we attribute to the result of his expedition through Greece and Asia; to the art treasures which he took back with him, and possibly to the Greek artists whom he is said to have brought over from Miletus and Eretria. The execution of the carving is so much more refined than that which exists in earlier examples that we are inclined to the belief it was carried out by Greek artists; \* they must, however, have worked under the direction of Xerxes or his art director, otherwise it is difficult to understand the strange jumble of various decorative forms which are employed in the carving of the upper part of the shafts under the bracket capital (Ill. 114, Figs. 5, 6, 7, 8). If we assume that the first essay was made in his great hall at Persepolis, the result would seem to have been quite satisfactory to him and to his successors, as it was employed in all palaces subsequently built in Persepolis, Susa, Istakr, and Ecbatana without any material change in design. The columns of the east and west porticoes of the great palace were not decorated in this way, and the only difference shown there is in the substitution of lion's heads and half-bodies in the bracket column of the east portico. These columns are nearly 13 diameters high, and, with the forty-eight flutes to their shafts from top to bottom, which seems to increase their height, have an extremely attenuated appearance (Ill. 114, Fig. 2). Moreover, the junction of the shaft with the bracket capital is ungainly, so that it is quite possible this may have called for the further enrichments which were subsequently given to all columns, whatever their dimensions might be. The columns at Istakr, 25 feet high, are only smaller copies of the great columns at Persepolis, which are 68 feet 9 inches high. The enrichments are three in number, separated one from the other by the bead and reel string, a favourite Greek ornament found in nearly all archaic Ionic capitals, the earliest known existing examples being those at Ephesus (Ill. 115, Figs. 18, 20),

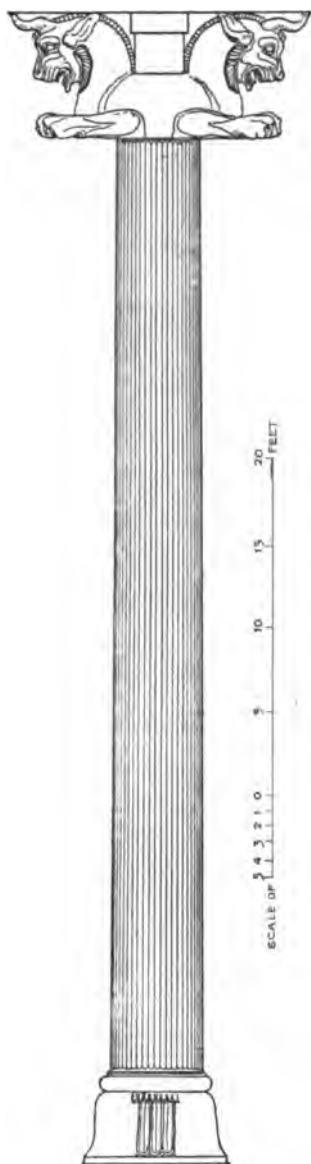
\* According to Mr. Cecil Smith, the mason's marks on the upper surfaces of the bases (now exposed) of the Hall of the Hundred Columns are characters from the Greek alphabet.





114.—PERSIAN COLUMN, CAPITALS AND BASES.





116.—COLUMN OF PORTICO, GREAT  
HALL OF XERXES, PERSEPOLIS.

They mark to some extent the junction with the bracket capital. If Xerxes took back with him some of the archaic capitals from the temple of Miletus, which he destroyed, they may have suggested the feature. In these early Ionic capitals the abacus is generally twice as wide as its depth; they are, in fact, bracket capitals, but the Persians already possessed their own type, which they preferred, so they utilised the feature in another way. Ill. 114, Fig. 7, shows the half plan and Ill. 114, Fig. 5, the decoration of what was the under surface of a Greek volute block, with the fillets of the cushion carried down vertically. The extra volutes may have been suggested by some Assyrian capitals, or were added to increase the height of the feature.

The middle enrichment at first sight resembles the well-known Egyptian palm tree capital, except that the leaves of the same are always indicated in the Egyptian example by incised lines each side of the stem; here under each lobe is a bud, which may be that of the papyrus plant, so that they represent the flower of same, and may have been copied from an Egyptian ivory brought from Egypt by Cambyses, just as the windows with balconies supported by shaft balusters shown in Assyrian bas-reliefs were copied from the ivories found

at Nimroud by Layard and now in the British Museum. The lowest enrichment reproduces the pendent petals of a flower, of which the complete form is shown in a capital found at Delphi by Professor Cockerell (not probably of very early date, but indicating the original *motif* from which the egg-and-tongue decoration in the Ionic volute was derived). The earliest existing example is that found at Naukratis, now in the British Museum (Ill. 115, Fig. 14). In the capital of the Votive Column at Delphi (Ill. 115, Fig. 15) the divisions between the petals are merged into the fluting of the shaft. In the Athens capital (Ill. 115, Fig. 16) the petals are painted only. In the terra-cotta capital from Gela (Ill. 115, Fig. 17) the petals are almost as long proportionately as those in the Persian capital. The examples from the archaic temple at Ephesus (Ill. 115, Figs. 18, 19, & 20) still suggest the origin of the egg and tongue (the upper part is at back), and one of the capitals (Ill. 115, Fig. 20) has its volutes decorated with a flower similar to that found in the capital from Susa (Ill. 114, Fig. 9).

Coming now to the shaft, the earliest examples of fluting are those found in the works of Xerxes. The number of flutes varies according to the size of the column; at Istakr, already referred to, there are only thirty flutes. The number in the other palaces at Persepolis varies from forty to fifty-two. The flutes in the early Greek examples vary in number; in the earliest examples at Ephesus, 560 B.C., there are fifty-two. There are no fillets in the Persian examples, as shown in Texier, but Dieulafoy's photogravure shows that some of the edges have worn away, which may have led Texier to the belief that he recognised fillets. To direct Greek influence therefore we may attribute the Persian fluting of the shafts.

If, in the capital and enrichments below the same, no change would seem to have been made, the bases show considerable variety, of which in Ill. 114, Figs. 10, 11, & 12, we give some of the more characteristic examples, and these compared with various selections from Greek work suggest the source from which some of the designs may have been derived. We have already referred to the pendent petals; there is another peculiar form to which the French give the name of *rais de cœur*, shown in the cornice of the archaic drum from Ephesus (Ill. 115, Fig. 22)

and in the capitals from Ægæ (Ill. 115, Fig. 28) and Neandria (Ill. 115, Fig. 24), which are embodied in Ill. 114, Fig. 11. Ill. 114, Fig. 12, would seem to be based on an Egyptian design as regards its upper portion, in which the globe between papyrus or lotus buds is carved.

When compared with the primitive base of Darius (Ill. 114, Fig. 5), the various combinations of design and their similarity to well-known decorative features throughout Ionia, some of which predate the work by Xerxes by nearly two centuries, constitute a strong argument in favour of the influence of Greek art upon that in Persia.

In conclusion we would express the hope that in course of time it may be possible to find a room in the British Museum where casts of the more remarkable examples of Persian work may be exhibited. Their connexion with Greek art is much closer than that which can be traced in the examples of Indian architecture which encumber the staircase in the British Museum and which might with greater advantage have been left with the Indian collection at South Kensington.



LIST OF SOME OTHER PAPERS ON ARCHÆOLOGICAL  
SUBJECTS, BESIDES THOSE PUBLISHED IN THIS  
VOLUME, READ AT THE ROYAL INSTITUTE OF  
BRITISH ARCHITECTS AND THE ARCHITEC-  
TURAL ASSOCIATION; ALSO OF FURTHER  
ARTICLES CONTRIBUTED TO THE ARCHITEC-  
TURAL JOURNALS, AND OF BOOKS WRITTEN  
AND EDITED BY THE AUTHOR.

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